6400 Line Matrix Printers

# Ethernet Interface User's Manual

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# 1 *Introduction*

## Overview

This chapter introduces you to the Ethernet** Interface architecture and special features, as well as providing information on installation and configuration tools.

### What is the Ethernet Interface?

The Ethernet Interface print server allows you to attach printers on a local area network (LAN) rather than attaching them directly to a host system. Following simple configuration steps, the printers can then be simultaneously shared with users on the network whether you are using TCP/IP, NetBIOS over TCP/IP, or IPX (Novell**) network protocol.

The Ethernet Interface package contains a network interface card to attach itself and the printer to the network.

### What Special Features are Available?

The Ethernet Interface offers an extensive list of features, including:

- built-in HTML forms for easy cross-platform configuration
- availability of the Printer Management Utility (PMU)
- availability of printer manager software
- support for SNMP printer MIB
- a detailed and easy-to-use command shell built in to the firmware
- multi-level configuration security through passwords, permission levels, and access lists

- WAN-wide communication access
- numerous printer logging methods (e.g. automatic email) to record printer errors and usage
- remote management through HTML forms, Telnet sessions, "**`rsh/rcmd/remsh`**" commands, SNMP, and pre-defined log methods
- extensive built-in troubleshooting tools
- built-in "**`telnet`**" and "**`ping`**" clients
- configurable memory usage by disabling protocols and destination services
- multiple destinations/queues for versatile printer manipulation and distinct print setups
- header and trailer strings to instruct printers on font, pitch, printing, etc.
- flexible naming conventions
- automatic network connection and frame type sensing
- simultaneous printing across all I/O ports and all supported protocols

## Indicators

The Ethernet Interface card at the rear of the printer has three indicator lights, shown in Figure 1. The LED patterns and the respective indications are given in Table 1. Refer to the Glossary for definitions.

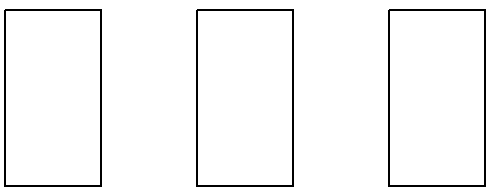



**Figure 1. Status Indicator Lights**

**Table 1. LED Pattern Indications**

| STAT | ERR | NET | Mode |
|---|---|---|---|
| ON | OFF | ON | RAM Test |
| ON | OFF | OFF | ROM Test |
| ON | ON | OFF | EEPROM Test |
| OFF | ON | ON | Network Interface Test |
| OFF | OFF | ON | PRN1 Test |
| FLASH | OFF | FLASH | Run Mode |
| FLASH | ON | FLASH | Auto Reset Mode |
| FLASH | FLASH | OFF | Firmware Panic |
| ON | FLASH | ON | Hardware Exception |

## Operating Modes

The Ethernet Interface has a self test and internally controlled modes. These are:

### Power on Self-Test

The power on self-test performs diagnostic tests on the Ethernet Interface processor, RAM, ROM, EEPROM, parallel ports, and network interface. The STAT, ERR, and NET LEDs indicate which test is currently in progress.

### Run and Auto Reset Modes

Run Mode is the normal operating state of the Ethernet Interface. Auto Reset mode is entered when the watchdog timer is triggered and the Print Server resets itself. In either mode, the STAT LED flashes at a varying rate, depending on whether the unit IP address is configured. The Run Mode and Auto Reset Mode indicator descriptions are given in Table 2. Refer to the Glossary for definitions.

**Table 2. Run Mode and Auto Reset Mode Indicator Descriptions**

| STAT | Rate | Indication |
|---|---|---|
| Flashes On | once per second | Normal Mode, IP address configured |
| Flashes On | 2.5 times per second | Monitor Mode, IP address not configured |
| Flashes Off | 2.5 times per second | Monitor Mode or Download Mode, IP address not configured |
| Flashes Off | once per 2 seconds | Download Mode, IP address configured |

## Conventions Used In This Manual

Command syntax and examples are formatted as follows:

- The Courier font in **boldface** indicates commands that you type:

**`$ ping ftp.IBM.com`**

- Regular Courier font indicates displayed results:

`ftp.IBM.com is alive`

- Variable values are shown in *italics* in command syntax, output, and in text.

**`ping`** ***`ipname`***
*`ipname`* `is alive`

## Notes and Notices

For your safety and to protect valuable equipment, it is very important that you read and comply with the notes and notices included in this manual. Danger and Caution notices are numbered. These numbers enable you to find translated versions of these notices in the IBM 6400 Line Matrix Printer Safety Notices booklet. Descriptions for each type of notice follow:

**DANGER:**

| | |
|---|---|
| **<#>** | **The word Danger indicates the presence of a hazard that has the potential of causing death or serious personal injury.** |

**CAUTION:**

| | |
|---|---|
| **<#>** | **The word Caution indicates the presence of a hazard that has the potential of causing moderate or minor personal injury.** |

**CAUTION:**

| | |
|---|---|
| **<#>** | **This symbol indicates an assembly that requires two or more persons to lift or hold.** |

**ATTENTION** **An attention notice indicates the possibility of damage to a program, device, system, or data.**

**IMPORTANT** **Important draws your attention to information vital to proper operation of the printer.**

**NOTE:** A note gives you helpful hints about printer operation.

## Safety Notices

**DANGER:**

| | |
|---|---|
| **<4>** | **Do not connect or disconnect any communication port, teleport, attachment connector, or power cord during an electrical storm.** |
| **<5>** | **Power off the printer and disconnect the power cord before connecting or disconnecting communication port, teleport, or attachment cable connector.** |

## Related Documentation

- *IBM 6400 Line Matrix Printer Setup Guide* (S544-5640)
  Provides information about unpacking and setting up the printer, information about configuration menus accessable from the operator panel and printer interfaces.
- *IBM 6400 Line Matrix Printer Operator's Guide* (S544-5641)
  Step-by-step instructions on daily printer operations, including descriptions of all the operator panel keys.
- *IBM 6400 Line Matrix Printer Safety Notices* (G544-5389)
  Provides translated safety notices.

# 2 *Installation and Configuration*

## Installation

The Ethernet Interface is unique in that different network connection options are available upon purchase. The base Ethernet Interface model provides an RJ-45 connector for 10Base-T (UTP) networks.

### Connecting to the Network

To attach the Ethernet Interface to a network as illustrated in Figure 2, plug the network cable into the Ethernet Interface connector.

Watch the LEDs in the rear of the printer as they cycle through the power on self-test (see page 15). When the test is complete, the STAT led is flashing.

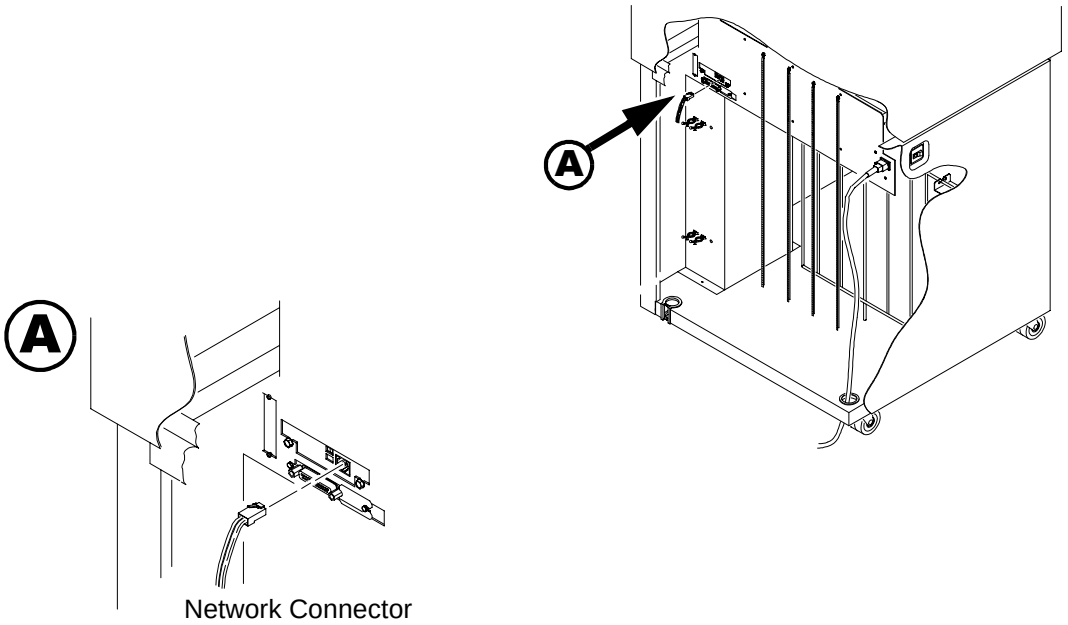



**Figure 2. Physical Setup**

# Configuration Tools

There are two parts to an Ethernet Interface setup:

1. Configuring the Ethernet Interface so it can be seen on the network. This involves network related settings (e.g. an IP address within TCP/IP environments) configured through the built-in command shell, npsh, printer web page or from the operator panel.
2. Configuring a host with a new printer so it knows how to send data to the Ethernet Interface. Just being able to see the printer on the network does not mean you can automatically print to it. A host has to be told where to send the data.

**NOTE:** Some network environments do not require any network settings to be configured on the Ethernet Interface. However, all network setups require configuration on the host end.

## Configuration using the Printer Operator Panel

The Ethernet Interface settings can be set from the printer operator panel. The procedure is described below.

**IMPORTANT** **When the printer is first powered on, the message "ETHERNET ADAPTER IS BEING INITIALIZED" displays on the operator panel. This process takes about two minutes. Make sure not to change the Ethernet Interface settings while this message is displayed to prevent a loss of Ethernet Interface configuration information. When the initialization is complete, the message "ETHERNET ADAPTER IS READY" displays, and the Ethernet Interface settings may be safely changed from the operator panel.**

You can set any of three listed parameters from the operator panel. These parameters are located in the “Ethernet Parameters” menu. The available parameters are:

- IP Address
- Gateway Address
- Subnet Mask

The procedure for changing any of the parameters is the same. The procedure for changing the IP Address is given here as an example. Use the same procedure for the other required parameters. To change the IP Address parameter:

1. Power on the printer.
2. Press **STOP** to get to NOT READY state.
3. Press **Menu** to display OPERATOR MENU.
4. Press **Scroll** until ETHERNET PARAMETERS is displayed, then press **Enter**.
5. Press **Enter** again then **Scroll** to choose an IP address octet to change, then press **Enter**.
6. Press **Scroll** to choose the desired value for the octet, then press **Enter**. The new value is shown with an asterisk. Press **Return**.
7. Repeat steps 5 through 6 until all IP address octets are set to the desired value.
8. Press **Return** until ETHERNET PARAMETERS is on the first display line.
9. Press **Scroll** to choose other IP parameters to change, then follow the above steps for these as well.
10. When finished, press **Return** multiple times until NOT READY is displayed.
11. Press **Start**.
12. Wait for “ETHERNET ADAPTER IS READY” message to display.

**IMPORTANT** **When a change is made from the operator panel, the Ethernet Interface is re-initialized. The messages "ETHERNET ADAPTER IS BEING RESET" and "ETHERNET ADAPTER IS BEING INITIALIZED" display on the operator panel. This process takes several minutes. Make sure not to shut the printer off or make further changes to the Ethernet Interface settings during this initialization period to prevent a loss of Ethernet Interface configuration information. When the initialization is complete, the message "ETHERNET ADAPTER IS READY" is displayed.**

Test the setting by performing a **ping** command from an OS/2* command prompt as follows:

**ping *ip_address***

where the ***ip_address*** is the IP address of the printer Ethernet Interface. If this does not work, repeat the steps to make sure the IP values on the operator panel are correct. If they are correct, contact your network administrator for possible network problems.

**NOTE:** Unlike most operator panel settings, the Ethernet Interface settings are not saved in Custom Sets; instead, they are stored directly on the Ethernet Interface adapter.

## HTML Forms

The Ethernet Interface settings can be configured over TCP/IP through a standard Web browser. The Ethernet Interface Web pages provide a handy way to access some of the commands built in to the print server.

**NOTE:** If a router is used, make sure a gateway value is configured.

To access the Ethernet Interface home page:

1. Make sure the print server has an IP address and subnet mask so it is recognizable on your TCP/IP network.
2. Make sure your network station can successfully "**ping**" the Ethernet Interface over the network.
3. Direct your Web browser to the Uniform Resource Locator (URL) "**http://*IPaddress*** " (e.g. "**http://192.75.11.9**").

The Ethernet Interface HTML structure is divided into several menus as shown in Figure 3.

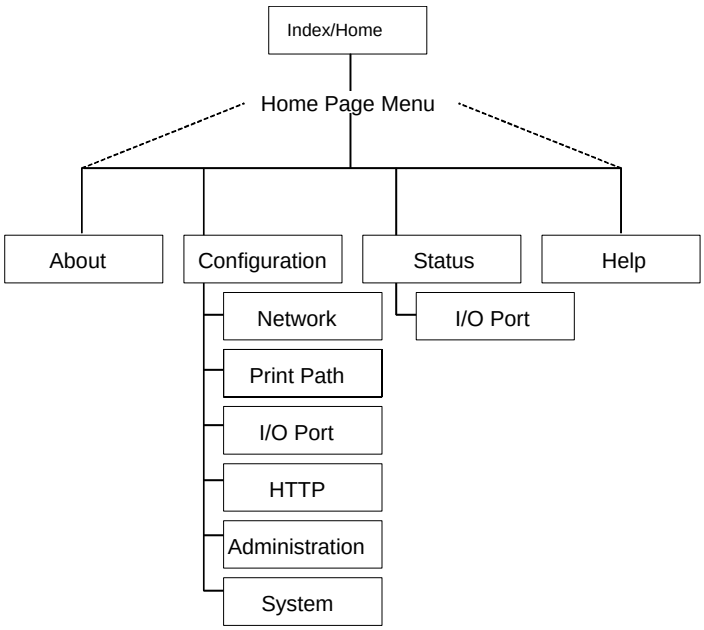



**Figure 3. Ethernet Interface HTML Structure**

**NOTE:** Online help is available for all HTML pages.

## Printer Status Screen

Using the printer IP Address and any standard web browser, you can check the status of the printer. Figure 4 shows the exact state of the printer by showing the printer LCD message.

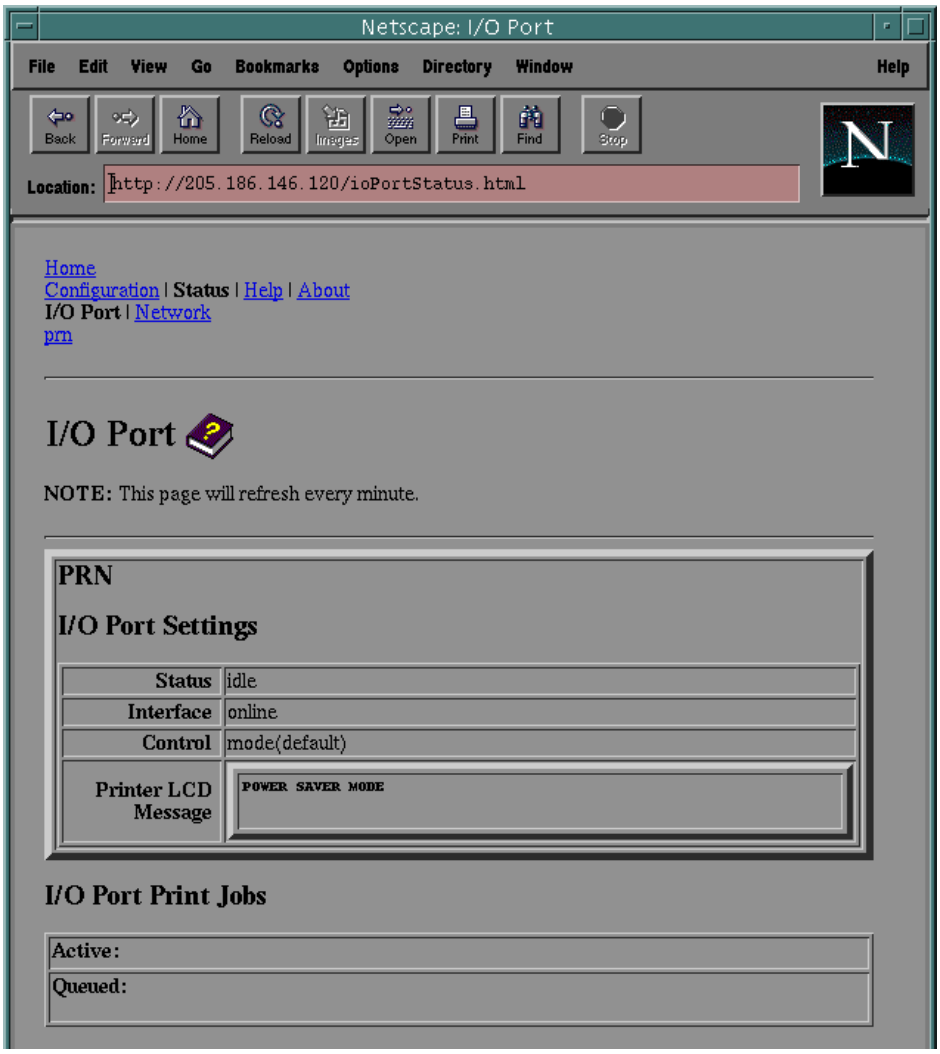



**Figure 4. WWW Printer Status Screen**

## Configuration Alternatives

Besides the HTML forms and software provided, the Ethernet Interface internal command shell, npsh, can also be reached using these methods:

### Telnet

A TCP/IP command that helps configure Ethernet Interface settings remotely. A TCP/IP host starts a Telnet session with the print server and logs in to the device command shell to alter and view settings.

Example:

```
telnet 192.75.11.9
```

### Remote Shell

A TCP/IP command that helps configure print server settings remotely. A TCP/IP host uses this command to remotely execute a single command on the Ethernet Interface.

Example:

```
rsh spike list prn
```

This command remotely executes the npsh command "**`list prn`**" on the Ethernet Interface named **`spike`**.

# 3 *OS/2 Configuration*

## Overview

This chapter details a complete OS/2 configuration setup including:

1. Configuring the Ethernet Interface with its TCP/IP settings
2. Configuring a new printer on an OS/2 workstation. The procedure given will be from an OS/2 Warp 4 system, but the setup is similar to OS/2 Warp 3 and v2.11.

OS/2 must have TCP/IP installed on it and be configured with the correct IP parameters. See OS/2 documentation/help and your network administrator.

## Configuring the Ethernet Interface TCP/IP Settings

There are mandatory TCP/IP settings (i.e., an IP address and subnet mask) needed before the print server can be detected on the network. There are also some additional settings that you may want to configure but these are optional. This section offers alternative methods for configuring your Ethernet Interface within an OS/2 environment and mentions some of the more common optional settings available.

## Mandatory Settings

The Ethernet Interface must be configured with an IP address and subnet mask at a minimum. Consult your network administrator to obtain the proper values for these parameters. To configure the IP address and subnet mask, see “Configuration Tools” on page 21.

## Optional Settings

One additional setting, the gateway address, is necessary if the OS/2 workstations must communicate with the Ethernet Interface across a router. Consult your network administrator to obtain the proper value for this parameter. To configure the gateway address, see “Configuration Tools” on page 21.

# OS/2 Workstation Configuration

OS/2 must use the TCP/IP LPR protocol in order to send jobs to the Ethernet Interface to be printed. This section will explain how to use the LPR command and how to setup an OS/2 print queue which will forward jobs to the printer using the LPR protocol.

## Using the LPR Command

At an OS/2 command prompt, enter **`lpr -s ip_address -p EthernetInterface_queue filename`**

**NOTE:** This name must be the name of an existing destination/queue on the Ethernet Interface and it must be lowercase by default. You will most likely use **d1prn**.

### Troubleshooting

Check the IP information on both the Ethernet Interface and the OS/2 station for correctness. Make sure the *EthernetInterface_queue* is actually defined on the Ethernet Interface and that you are spelling it correctly.

**NOTE:** During Power Up, the printer performs an interface hardware test. The presence of the Ethernet Interface menu selections at the printer operator panel indicates that the Ethernet Interface hardware is functioning properly. See the *Setup Guide* for configuration menu information.

## Using an OS/2 LPR Print Queue

This section describes how to setup an OS/2 Warp 4 print queue to print to the Ethernet Interface using the LPR protocol. TCP/IP for OS/2 must be installed on your OS/2 workstation. This procedure is similar to OS/2 Warp 3 and v2.11.

To setup the printer queue:

1. Find the Printer template icon. It may be in the Printers folder or the Templates folder.
2. Right click on the icon then select “Install.” The “Create a printer” dialog box is displayed.
3. Enter any desired name for the printer. This will be the name of the printer queue.
4. In the “Default printer driver” list, select the desired driver. If the desired driver does not appear in the list, click on “Install new printer driver...” and follow the instructions to install the desired driver.
5. In the “Output port” list, double click on an unshaded \PIPE\LPDx port. If all are shaded, you will have to double click on a shaded port and change the parameters. If no \PIPE\LPDx ports are shown, follow these steps to install them:
    a. Right click on a port and select “Install.”
    b. Select the “New port drivers” radio button.
    c. In the “Directory” field, type ***d*:\TCPIP\DLL** where *d*: is the drive where the TCPIP subdirectory exists.
    d. Click on “Refresh.” Several \PIPE\LPDx port icons should appear in the “Output port” list. If none appear, type ***d*:\MPTN\DLL** in step c. and try this step again.

**NOTE:** If no ports appear after completing step d., search your drives for the LPRPDRVR.PDR and type the path to this file, not including the file name, in step c. The final step available is to ask OS/2 support to install these ports.

e. Select all the ports with the mouse pointer and click on “Install.” The \PIPE\LPDx ports should now show in the “Output port” list.

6. The “\PIPE\LPDx - Setting” dialog box is displayed.
7. In the “LPD server” field, type the IP address of the Ethernet Interface.
8. In the “LPD printer” field, type the name of the defined destination / queue on the Ethernet Interface.

**NOTE:** This name must be the name of an existing destination/queue on the Ethernet Interface and it must be lowercase by default. You will most likely use **‘d1prn’**. If the IPDS* feature is installed, queue name **‘d4prn’** is not available.

9. Optionally, click on “Help” to understand the other parameters and enter those values.
10. Click “OK.”
11. Click on “Create.” The print queue is created and placed in the Printers folder or possibly on the OS/2 desktop.
12. Make sure LPRPORTD is running. Type **`Ctrl-Esc`** and check the list for a line that contains LPRPORTD. If it is running, this process is complete. If it is not running, enter the following at the OS/2 command prompt:

```
start lprportd
```

You will likely want to put this command in your “STARTUP.CMD” file, or use the TCP/IP Configuration tool to set it to autostart on boot up.

Any jobs sent to this queue will now be forwarded to the Ethernet Interface to be printed.

## Starting the LPR Port Daemon

The LPR Port Daemon must be started to enable TCP/IP printing. To start the LPR Port Daemon;

1. Open the TCP/IP folder, which is in the OS/2 System folder for Warp 3.0.
2. Open TCP/IP Configuration.
3. Select the “Autostart” tab on the notebook.
4. In “Services to Autostart,” select “lprportd.”
5. Select “Foreground Session” and “Minimized.”
6. Close the notebook by double clicking the system icon, which is located in the upper left corner.
7. Select “Save.”
8. If prompted, respond **`Yes`** to save the configuration changes.
9. At the OS/2 command prompt, enter **`tcpstart`** to restart TCP.

## Troubleshooting

**NOTE:** During Power Up, the printer performs an interface hardware test. The presence of the Ethernet Interface menu selections at the printer operator panel indicates that the Ethernet Interface hardware is functioning properly. See the *Setup Guide* for configuration menu information.

Check the IP information on both the Ethernet Interface and OS/2 station for correctness.

Make sure the value in step 8 is actually defined on the Ethernet Interface. See “Configuration Tools” on page 21 to determine how to verify this. Verify also that you are spelling the printer name correctly.

Verify that LPRPORTD is running.

## TCP/IP Access Problem

If you can "**ping**" the printer from a workstation, but you cannot Web browse, Telnet, or print to the printer through the Ethernet Interface, there may be an incorrect entry in the TCP access list. In order for this workstation to use the Ethernet Interface in this case, one of two things must happen.

1. The TCP list must have an entry added to grant access to this workstation.
2. All entries must be deleted from the TCP list to grant all workstations/ hosts access to the above TCP services.

To view the current access list:

Use the printer operator panel to access the configuration menu (see the *Setup Guide* for configuration menu information). From the DIAGNOSTICS/Printer Tests menu choose the E-net Test Page. When the page prints, look under the "TCP ACCESS TABLE" section for the TCP access list entries.

To add/delete a TCP access list entry, refer to "TCP Access Lists" on page 179.

**NOTE:** When the following procedure is used, the TCP access list will be cleared but all IP addresses will need to be entered again after the procedure is complete.

To reset all TCP/IP values to the factory defaults when access is impossible:

1. Obtain a printer configuration printout using the operator panel. See the *Setup Guide* for configuration menu information.
2. Power off the printer.
3. On the Ethernet Interface, place SWITCH 2, the center switch, in the down position.
4. Power on the printer and wait for the READY state.
5. On the Ethernet Interface, place SWITCH 2, the center switch, in the up position.

6. From a workstation attached to this network segment, create an ARP entry. The Ethernet Interface IP address and hardware or MAC address are needed. At the workstation enter:

**arp -s <*ipaddress*> <*MACaddress*>**
**ping <*ipaddress*>**

7. Try to "**ping**" this IP address to see if the Ethernet Interface can be seen on your network. If the interface does not respond, verify you are on the same network segment as the printer and that the ARP entry was created.
8. Telnet into the Ethernet Interface using the same IP address as above. Log in as root with no password.
9. At the system prompt, enter:

**store tcpip from default**
**config http on**
**reset**

**NOTE:** This will reset all TCP/IP settings to factory default and reset the Ethernet Interface.

10. Wait five minutes for the Ethernet Interface to reset.
11. Power the printer off and then back on.
12. Wait for the "ETHERNET ADAPTER IS READY" message to display.
13. Set the IP address, subnet mask, and default gateway parameters to the desired values. (see "Configuration Tools" on page 21).

## Web Browser/HTTP Problem

In some cases you may not be able to browse the printer web page simply because the Ethernet Interface HTTP may be turned off.

If you cannot "**ping**" the Ethernet Interface IP address, make sure the IP Address, subnet mask, and default gateway are set correctly by checking the Ethernet Parameters menu from the operator panel. See the *Setup Guide* for configuration menu information.

If you can "**ping**" the Ethernet Interface IP address but can not access the web pages, perform the following procedure to verify the Ethernet Interface HTTP is turned on.

1. Telnet into the Ethernet Interface and log in as root with no password.
2. At the system prompt enter the following commands:

```
config http on
save
reset
```

3. After approximately 5 minutes, point your browser to the Ethernet Interface IP address. The printer web pages should now be accessible.

If you are still experiencing difficulty accessing or browsing the printer, contact technical support for further assistance.

# 4 AS/400 Configuration for an ASCII Printer

## Overview

This chapter details a complete AS/400* configuration setup including:

1. Developing Line Descriptions with CRTLINETH
2. Configuring the AS/400 for TCP/IP
3. Configuring the AS/400 for Printing
4. Verifying Printing of AS/400

This document assumes no AS/400 printer configuration has been done. If any configuration has been done, please follow the procedure to the point at which continued configuration is required.

### Developing Line Descriptions with CRTLINETH

For each LAN adapter on the AS/400, a line description needs to be created for the Ethernet. This is required for Release V3R2 and V3R7.

If a line description already exists, make sure the SSAP list includes default options “AA” and “12.” You must also know the LAN speed for the AS/400 LAN adapter.

**NOTE:** To change a line description, you need to vary the line off before making the change. After making the change, you need to vary the line back on.

To change an existing line description, use the CHGLINETH command. To create a line description, use CRTLINETH.

**NOTE:** SSAPS of “AA” and “12” are automatically set as default values in the line description when “*CALC” is used in creating new line descriptions. You do not need to set these values unless they have been changed.

To create a line description, enter the following command:

**CRTLINETH LIND(ETHLAN) RSRCNAME(LIN041)**

Your completed screen should look like Figure 5.

```
5763SS1 V3R2M0  960517                              BLDD60    09/11/96  12:25:46
Line description . . . . . :   LIND        ETHLAN
Option . . . . . :   OPTION      *ALL
Category of line . . . . . :                 *ELAN
Resource name  . . . . . :   RSRCNAME    LIN041
Online at IPL  . . . . . :   ONLINE      *YES
Vary on wait . . . . . :   VRYWAIT     *NOWAIT
Local adapter address  . . . . . :   ADPTADR     *ADPT
Exchange identifier  . . . . . :   EXCHID      056A1005
Ethernet standard  . . . . . :   ETHSTD      *ALL
Maximum controllers  . . . . . :   MAXCTL      40
Error threshold level  . . . . . :   THRESHOLD   *OFF
Text . . . . . :   TEXT        *BLANK
--------------Active Switched Controllers--------------
  (No active switched controllers attached)
SSAP list  . . . . . :   SSAP
----Source Service Access Points-----    ----Source Service Access Points-----
   SSAP      Maximum Frame    Type          SSAP      Maximum Frame    Type
    04            1496        *SNA           AA            1496        *NONSNA
     12            1496        *NONSNA        C8            1496        *HPR
Group address  . . . . . :   GRPADR
---------------Group Addresses----------------
  (No group addresses found)
Link speed . . . . . :   LINKSPEED   10M
Cost/connect time  . . . . . :   COSTCNN     0
Cost/byte  . . . . . :   COSTBYTE    0
Security for line  . . . . . :   SECURITY    *NONSECURE
Propagation delay  . . . . . :   PRPDLY      *LAN
User-defined 1 . . . . . :   USRDFN1     128
User-defined 2 . . . . . :   USRDFN2     128
User-defined 3 . . . . . :   USRDFN3     128
Autocreate controller  . . . . . :   AUTOCRTCTL  *NO
Recovery limits  . . . . . :   CMNRCYLMT
  Count limit  . . . . . :                2
  Time interval  . . . . . :              5
```

**Figure 5. Example Ethernet Line Description**

The following three parameters must be specified:

**Line description name (LIND)**

This line description name is the user's name for the AS/400 adapter. This name must be identical to the name entered when the TCP/IP is configured on the AS/400, as described in "Configuring AS/400 for an ASCII Printer", below.

**Resource name (RSRCNAME)**

System-assigned name for the interface (for example, LN041).

**SSAP**

When *CALC is used, the values of "12" and "AA" are entered automatically as defaults. Verify that those SSAP values have not been changed.

# Configuring AS/400 for ASCII using TCP/IP

The next step in configuring the AS/400 for the IBM 6400 printer is to configure the interface on the AS/400 for TCP/IP

**NOTE:** The AS/400 interface is not the IBM NIC. Do not set the AS/400 interface address to the same address as the NIC IP address. Also do not add the NIC to the AS/400 TCP/IP interface list.

## Configuring with ADDTCPIFC

ADDTCPIFC is used to add a TCP/IP interface to AS/400. This step configures the AS/400 for attachments to a TCP/IP network.

At the AS/400 command line, enter the following command:

```
ADDTCPIFC INTNETADR ('9.99.15.188') LIND(ETHLAN)
SUBNETMASK('255.255.255.0')
```

Your completed screen should look like Figure 6.

```
System: BLDD6
Internet address . . . . . :   9.99.15.188
Subnet mask. . . . . :   255.255.255.0
Line description . . . . . :   ETHLAN
Line type. . . . . :   *Elan
Interface status. . . . . :   Inactive
Type of service . . . . . :   *Normal
Maximum transmission unit . . . . . :   *Lind
Automatic start . . . . . :   *Yes
```

**Figure 6. Example ADDTCPIFC Interface**

The following parameters must be specified:

**Internet Address**

Internet address of the AS/400 Ethernet LAN adapter.

**NOTE:** Do not use the IP address of the NIC.

**Subnet Mask**

The Subnet Mask for this AS/400 TCP/IP interface (for example, **255.255.255.0**).

**Line Description**

The name assigned to the AS/400 line description as described in “Developing Line Descriptions with CRTLINETH” on page 35.

**NOTE:** Each AS/400 LAN adapter will have its own line description.

## Configuring a Router Definition with ADDTCPRTE

If necessary, use the ADDTCPRTE command to create a route definition. This is required if the printer is somewhere other than on a local segment and must cross bridges.

## Configuring a Local Domain and Hostname

The AS/400 print commands, described in “Setting up Printing for ASCII Files” on page 40, require a local name and hostname. If you have already configured LAN attached TCP/IP printers on the AS/400 system, you will have a local domain name and hostname configured on the system.

**NOTE:** If you already have a local domain name and hostname configured on the system, do not change your setup.

If the local domain name and hostname file is empty, the file must be setup. This control file information is used to determine if a print request comes from an authorized host.

To configure the local domain and hostname, you will run the CFGTCP command and select Option “12” from the menu. Enter a local domain name, such as ***city.company.com***. Enter a local hostname, such as **as400-01**. This is the name of your AS/400 system and must match the hostname for your system in the host entry table. Refer to “Configuring a TCP/IP Host Table Entry”, below.

**NOTE:** If the printer and AS/400 are not on the same local LAN segment, use CFGTCP Option 2 to verify that there is a route defined in the TCP/IP route list.

## Configuring a TCP/IP Host Table Entry

Although it is optional to create a TCP/IP host table entry, IBM suggests that you take this step. Add the AS/400 name and the IP address of the LAN adapter to the “Host Table Entries.”

# Configuring the AS/400 for Printing

The procedure for configuring an AS/400 for printing requires that you:

1. Setup the printing capability
2. Verify the setup with a print job

In order to accomplish this configuration, you need the following information:

### Remote Printer Queue name

Set for any of **'d1prn'** through **'d4prn'**.

**NOTE:** The Remote Printer Queue name must be all lower case. Do not use PASS.

**NOTE:** When the IPDS feature is installed, queue name **'d4prn'** is not available.

### IP address

IP address for the NIC.

## Setting up Printing for ASCII Files

The next stop in configuring the AS/400 for IBM network printers is to setup the remote printing capability. There are two ways to do this. You can specify the LPR parameters manually each time you send a file to the printer, or use Remote Writer and a remote output queue for automatic printing to the printer.

### To use LPR manually:

1. Start TCP/IP, if it is not already running, by entering the command **STRTCP**.
2. At the AS/400 command line, enter **LPR**.
3. The following example displays only the parameters you need to specify.

| Send TCP/IP Spooled File (LPR) | | | |
|---|---|---|---|
| Type choices, press Enter. | | | |
| **Remote system** | **RMTSYS** | **>** | ***INTNETADR** |
| **Printer queue** | **PRTQ** | **>** | **'d1prn'** |
| Job name | JOB | | * |
| User | | | |
| Number | | | |
| Spooled file number | SPLNMBR | | *ONLY |
| **Destination type** | **DESTTYP** | | ***OTHER** |
| **Transform SCS to ASCII** | **TRANSFORM** | | ***YES** |
| **Manufacturer type and model** | **MFRTYPMDL** | **>** | ***IBM6400EP** |
| **Internet address** | **INTNETADR** | **>** | **'9.99.2.3'** |

The following parameter values are required:

### Remote system

Enter the hostname of your printer or ***INTNETADR**, which then prompts you to specify the IP address of your printer.

### Printer Queue (PRTQ)

Set to **'d1prn'** through **'d4prn'**. The remote printer queue name must be all lower case, entered in single quotes.

**NOTE:** When the IPDS feature is installed, queue name **'d4prn'** is not available.

### Destination type (DESTTYP)

Specify ***OTHER** for the DESTTYP parameter.

### Transform (TRANSFORM)

Specify ***YES**.

**Manufacturer Type and Model (MFRTYPMDL)**

Select a manufacturer type and model. This is the name of the WSCO. Select ***IBM6400EP** for Epson** emulation or ***IBM6400** or ***IBM42023** for Proprinter* Emulation if you have AS/400 V3R2 and above or V3R7 and above.

**Internet Address (INTNETADR)**

IP address of the NIC.

**NOTE:** You may specify either ***INTNETADR** (and the NIC IP address) or the hostname for the NIC (if you added the printer to the host table entry as directed in “Configuring a TCP/IP Host Table Entry” on page 39).

## To create an Automatic Remote Output Queue:

1. From the AS/400 command line, enter **CRTOUTQ**.
2. The following example displays the parameters you need to specify.

Send TCP/IP Spooled File (LPR)

Type choices, press Enter.

| | | | |
|---|---|---|---|
| **Output queue** | **OUTQ** | **>** | **USERNAME** |
| Library | | | *CURLIB |
| Maximum spooled file size: | MAXPAGES | | |
| Number of pages | | | *NONE |
| Staring time | | | |
| Ending time | | | |
| + for more values | | | |
| Order of files on queue | SEQ | | *FIFO |
| **Remote system** | **RMTSYS** | **>** | ***INTNETADR** |
| **Remote printer queue** | **RMTPRTQ** | **>** | **'d1prn'** |
| **Writers to autostart** | **AUTOSTRWTR** | | **1** |
| Queue for writer messages | MSGQ | | QSYSOPR |
| Library | | | *LIBL |
| **Connection type** | **CNNTYPE** | **>** | ***IP** |
| **Destination type** | **DESTTYP** | | **XAUTOQ XAIX** |
| **Host print transform** | **TRANSFORM** | | ***YES** |
| **Manufacturer type and model** | **MFRTYPMDL** | **>** | ***IBM6400EP** |
| Workstation Customizing Object | WSCST | | *NONE |
| Library | | | |
| **Internet address** | **INTNETADR** | **>** | **'9.99.57.173'** |
| Destination options | DESTOPT | | *NONE |
| Print separator page | SEPPAGE | | *YES |
| User defined option | USRDFNOPT | | *NONE |

3. Enter values for the following parameters:

**Output queue (OUTQ)**

The name of the AS/400 output queue. The name can be anything you would like. This name is not the same as the printer internal queue name, **'d1prn'**.

**NOTE:** When the IPDS feature is installed, queue name **'d4prn'** is not available.

**Remote system (RMTSYS)**

Internet address of the NIC on the printer (***INTNETADR** prompts you for this) of the hostname of the NIC.

**Remote printer queue (RMTPRTQ)**

Default name of the IBM network printer. Set for any of **'d1prn'** through **'d4prn'**. The remote printer queue name must be all lower case, entered in single quotes.

**NOTE:** When the IPDS feature is installed, queue name **'d4prn'** is not available.

**Writer to Autostart (AUTOSRTWTR)**

Set the value to **1**. This will start the Remote Writer when the queue is created, and it is automatically starts the Remote Writer after each IPL of the AS/400 and whenever STRTCP is started.

**Connection type (CNNTYPE)**

Specify this value as ***IP**.

**Destination type (DESTTYP)**

Specify **XAUTOQ XAIX**. **XAUTOQ** is a performance enhancement, in which data is not required to be transformed again if the connection is interrupted. **XAIX** allows printing of multiple copies.

**Transform (TRANSFORM)**

Specify this value as ***YES**.

**Manufacturer type (MFRTYPMDL)**

Select a manufacturer type and model. This is the name of the WSCO. Select ***IBM6400EP** for Epson emulation or ***IBM6400PR** or ***IBM42023** for Proprinter Emulation.

**Internet address (INTNETADR)**

Specify the IP address of the printer.

# Verify Printing on AS/400

This section verifies that the printer is capable of printing ASCII files and that the printer can be pinged on the network.

To test ASCII printing:

1. Start TCP/IP, if it is not already running, by entering the command **STRTCP**.
2. Verify that the AS/400 TCP/IP interface is active.
3. Ping the printer from an AS/400 workstation with the command: **ping *ip_address***.

   Where ***ip_address*** is the Internet address of the remote system printer (the NIC) or the hostname of the printer (if you put the hostname in the host entry table as directed in “Configuring a TCP/IP Host Table Entry” on page 39).
4. If the printer cannot be pinged, proceed to “AS/400 ASCII Troubleshooting” on page 46.
5. Use one of the following methods to send a spooled file to the printer:

   - Enter the LPR command on the AS/400 command line with the appropriate parameters. See “To use LPR manually:” on page 40.
   - Enter **STRRMTWTR *name*** on the AS/400 command line, where ***name*** is the name of the AS/400 remote output queue (not the printer internet queue, as described in “To create an Automatic Remote Output Queue:” on page 43).
   - Use the **WRKOUTQ** command to send jobs.

# AS/400 ASCII Troubleshooting

During Power Up, the printer performs an interface hardware test. The presence of the Ethernet Interface menu selections at the printer operator panel indicates that the Ethernet Interface hardware is functioning properly. See the *Setup Guide* for configuration menu information.

If you have trouble pinging the printer:

1. Verify the configuration of AS/400, including the printer and any intervening devices such as routers and bridges.
2. Verify that the AS/400 line description is varied on and the printer is turned on and displays a status of READY.
3. Verify that the AS/400 TCP/IP is active.

## TCP/IP Access Problem

If you can "**`ping`**" the printer from a workstation, but you cannot Web browse, Telnet, or print to the printer through the Ethernet Interface, there may be an incorrect entry in the TCP access list. In order for this workstation to use the Ethernet interface in this case, one of two things must happen.

1. The TCP list must have an entry added to grant access to this workstation.
2. All entries must be deleted from the TCP list to grant all workstations/ hosts access to the above TCP services.

To view the current access list:

Use the printer operator panel to access the menu. See the *Setup Guide* for configuration menu information. From the Operator Print Test menu choose the Ethernet Test Page. When the page prints, look under the "TCP ACCESS TABLE" section for the TCP access list entries.

To add/delete a TCP access list entry, refer to "TCP Access Lists" on page 179.

**NOTE:** When the following procedure is used, the TCP access list will be cleared but all IP addresses will need to be entered again after the procedure is complete.

To reset all TCP/IP values to the factory defaults when access is impossible:

1. Obtain a printer configuration printout using the operator panel. See the *Setup Guide* for configuration menu information.
2. Power off the printer.
3. On the Ethernet Interface, place SWITCH 2, the center switch, in the down position.
4. Power on the printer and wait for the READY state.
5. On the Ethernet Interface, place SWITCH 2, the center switch, in the up position.
6. From a workstation attached to this network segment, create an ARP entry. The Ethernet IP address and hardware or MAC address are needed. At the workstation enter:
   **`arp -s <`*`ipaddress`*`> <`*`MACaddress`*`>`**
   **`ping <`*`ipaddress`*`>`**
7. Try to "**`ping`**" this IP address to see if the Ethernet Interface can be seen on your network. If the interface does not respond, verify you are on the same network segment as the printer and that the ARP entry was created.
8. Telnet into the printer Ethernet Interface using the same IP address as above. Log in as root with no password.
9. At system prompt, enter:
   **`store tcpip from default`**
   **`config http on`**
   **`reset`**

**NOTE:** This will reset all TCP/IP settings to factory default and reset the Ethernet Interface.

10. Wait five minutes for the Ethernet Interface to reset.
11. Power the printer off and then back on.
12. Wait for the "ETHERNET ADAPTER IS READY" message to display.
13. Set the IP address, subnet mask, and default gateway parameters to the desired values. (See "Configuration Tools" on page 21.)

## Web Browser/HTTP Problem

In some cases you may not be able to browse the printer web page simply because the Ethernet Interface HTTP may be turned off.

If you cannot "**ping**" the Ethernet Interface IP address, make sure the IP Address, subnet mask, and default gateway are set correctly by checking the Ethernet Parameters menu from the operator panel. See the *Setup Guide* for configuration menu information.

If you can "**ping**" the Ethernet Interface IP address but can not access the web pages, perform the following procedure to verify the Ethernet Interface HTTP is turned on.

1. Telnet into the Ethernet Interface and log in as root with no password.
2. At the system prompt enter the following commands:

```
config http on
save
reset
```

3. After approximately 5 minutes, point your browser to the Ethernet Interface IP address. The printer web pages should now be accessible.

If you are still experiencing difficulty accessing or browsing the printer, contact technical support for further assistance.

# 5 *AS/400 Configuration for an IPDS Printer*

## Configuring on AS/400 as an IPDS Printer

Use this chapter to configure your IBM 6400 printer on AS/400 as an IDPS printer. To print IPDS, you must install the IPDS option on your printer. Once configured as an IPDS printer, the printer can also print AFP* and SCS, but these datastreams must be converted to IPDS first. See “Printing AFP, IPDS, and SCS Files”, below.

### Printing AFP, IPDS, and SCS Files

IBM 6400 network printers configured as IPDS only print IPDS files. AFP and SCS files can be printed, but they must be transformed to IPDS before printing.

- APF files are transformed directly by Print Services Facility* (PSF/400, an integrated feature of OS/400), which then sends the transformed file to the printer.
- SCS files are transformed into IPDS by setting the IPDSPASTHR parameter to YES (see Figure 9 on page 58 or Figure 10 on page 61). This path yields the best performance by sending IPDS files directly to the printer with no transform.

## Requirements

Contact IBM to obtain the latest PTFs for PSF/400.

For IPDS printing, you also need to install the IPDS option for the printer.

## Configuration Checklist

**NOTE:** All of the following configuration steps carried out on the AS/400 may require “create” or “change” authority.

1. If you have not already done so, set up the printer and install the NIC. See Chapter 2.
2. Using the printer operator panel, set up the printer for IPDS by setting the parameters and values shown in Table 3.

**Table 3. Operator Panel Settings**

| Menu | Item | Setting |
|---|---|---|
| PRINTER CONTROL | Interface Selection | • AUTO SWITCH if you use the printer for other than IPDS printing<br>• ETHERNET for IPDS only |
| IPDS | IPDS Emulation Mode | 4234-12 |

3. Set TCP/IP addresses for the printer, such as an IP Address, Gateway Address, or Subnet Mask. See “Configuration Tools” on page 21.
4. If the printer and AS/400 are not on the same LAN segment, verify there is a route defined in the TCP/IP route list. If necessary, use the ADDTCPRTE command to create a route definition. You need this if your printer is somewhere other than on a local segment.
5. You need the IP address of the NIC to configure the NIC.
6. If you have not yet done so, create a line description for your Ethernet IBM NIC. See “Developing Line Descriptions with CRTLINETH” on page 35.

7. Create or verify the existence of an AS/400 TCP/IP interface for Ethernet. See “Configuring an AS/400 TCP/IP Interface with ADDTCPIFC” on page 52.
8. The next step depends on your AS/400 release. Configure your printer with one of these procedures:
   - “Configuring PSF/400 for IPDS on V3R2” on page 54
   - “Configuring PSF/400 for IPDS on V3R7 and Above” on page 60
9. Verify the printer is ON using the VFYCFG command.
10. Verify that TCP/IP has been started using the STRTCP command.
11. Test your configuration. See “Verifying the IPDS Configuration on AS/400” on page 65.
12. To share the printer on the network, verify that the necessary parameters have been set correctly. See “Sharing the AS/400 Printer on the Network” on page 67.
13. If you have problems, refer to “AS/400 Troubleshooting” on page 70.

# Configuring an AS/400 TCP/IP Interface with ADDTCPIFC

**NOTE:** Do not enter the IP address of the NIC. Do not set the AS/400 interface address to the same address as the NIC IP address. Also, do not add the NIC to the AS/400 TCP/IP interface list.

## Configuring an Interface for Ethernet

ADDTCPIFC is used to add a TCP/IP interface to AS/400. This step configures the AS/400 for attachments to a TCP/IP network.

At the AS/400 command line, enter the following command:

```
ADDTCPIFC INTNETADR ('9.99.15.188') LIND(ETHLAN)
SUBNETMASK('255.255.255.0')
```

Your completed screen should look like Figure 7.

| | | |
|---|---|---|
| System: BLDD60 | | |
| **Internet address . . . . . :** | | **9.99.15.188** |
| **Subnet mask . . . . . :** | | **255.255.255.0** |
| **Line description . . . . . :** | | **ETHLAN** |
| Line type . . . . . : | | *ELAN |
| Interface status . . . . . : | | Inactive |
| Type of service . . . . . : | | *NORMAL |
| Maximum transmission unit . . . . . : | | *LIND |
| Automatic start . . . . . : | | *YES |

**Figure 7. Example ADDTCPIFC Interface**

The following parameters must be specified:

**Internet Address**

Internet address of the AS/400 Ethernet LAN adapter.

**NOTE:** Do not use the IP address of the NIC.

**Subnet Mask**

The Subnet Mask for this AS/400 TCP/IP interface (for example, **255.255.255.0**).

**Line Description**

The name assigned to the AS/400 line description as described in “Developing Line Descriptions with CRTLINETH” on page 35. Each AS/400 LAN adapter will have its own line description.

## Configuring a TCP/IP Host Table Entry

Although optional, IBM recommends you create a TCP/IP host table entry. Add the AS/400 name and the IP address of the LAN adapter to the “Host Table Entries”. Also, add the hostname and IP address of the printer to the list. You can access the host table entries function by using the CFGTCP command, then selecting option 10 from the menu.

You can also add entries to your host table for both the hostname and the fully qualified network name for your system. The entry should match what you configured for host and domain name. For example, if your hostname is “RCHASM03” and your domain name is “RCHLAND.IBM.COM”, your fully qualified network name is “RCHASM03.RCHLAND.IBM.COM”. In your host entry table, enter both RCHASM03 and RCHASM03.RCHLAND.IBM.COM.

## Configuring PSF/400 for IPDS on V3R2

To configure IPDS on AS/400 V3R2, use the following commands:

- CRTDEVPRT
- CRTPSFCFG

### Configuring PSF with CRTDEVPRT on V3R2

This section describes how to create a printer device description.

1. At the AS/400 command line, enter a command in the form:

```
CRTDEVPRT  DEVD(P6400) DEVCLS(*RMT) TYPE(*IPDS)
           MODEL(0) AFP(*YES) AFPATTACH(*APPC) FONT(11)
           RMTLOCNAME(TCPIP) FORMFEED(*CONT) TEXT('IBM
           6400 NETWORK PRINTER')
```

2. A completed screen looks like the example shown in Figure 8.

Display Device Description

| | | |
|---|---|---|
| **Device Description . . . . . :** | **DEVD** | **P6400** |
| Option . . . . . : | OPTION | *ALL |
| Category of device . . . . . : | | *PRT |
| Automatically created . . . . . : | | NO |
| **Device class. . . . . :** | **DEVCLS** | ***RMT** |
| **Device type . . . . . :** | **TYPE** | ***IPDS** |
| **Device model. . . . . :** | **MODEL** | **0** |
| **Advanced function printing . . . . . :** | **AFP** | ***YES** |
| **AFP attachment. . . . . :** | **AFPATTACH** | ***APPC** |
| Online at IPL . . . . . : | ONLINE | *YES |
| **Font . . . . . :** | **FONT** | |
| **Identifier . . . . . :** | | **011** |
| **Point size . . . . . :** | | ***NONE** |
| **Form feed. . . . . :** | **FORMFEED** | ***CONT** |
| Separator drawer . . . . . : | SEPDRAWER | *FILE |
| Separator program . . . . . : | SEPPGM | *NONE |
| Library . . . . . : | | |
| Printer error message . . . . . : | PRTERRMSG | *INQ |
| Message queue. . . . . : | MSGQ | QSYSOPR |
| Library . . . . . : | | *LIBL |
| Maximum pending requests . . . . . : | MAXPNDRQS | 6 |
| Print while converting . . . . . : | PRTCVT | *YES |
| Print request timer. . . . . : | PRTRQSTMR | *NOMAX |
| Form definition . . . . . : | FORMDF | F1C10110 |
| Library . . . . . : | | *LIBL |
| Character identifier . . . . . : | CHRID | *SYSVAL |
| **Remote location . . . . . :** | **RMTLOCNAME** | **TCPIP** |
| Local location . . . . . : | LCLLOCNAME | *NETATR |
| Remote network identifier . . . . . : | RMTNETID | *NETATR |
| Mode . . . . . : | MODE | QSPWTR |
| Dependent location name . . . . . : | DEPLOCNAME | *NONE |
| Text . . . . . : | TEXT | 'IBM 6400 Network Printer' |

**Figure 8. Example CRTDEVPRT Command (V3R2)**

3. Values must be entered for the following parameters:

**Device Description (DEVD)**

The device description or name. This value must match the value entered for the **PSFCFG** parameter in “Configuring AFP with CRTPSFCFG on V3R2” on page 57.

**Device Class (DEVCLS)**

Specify ***RMT**.

**Device Type (TYPE)**

Specify ***IPDS**.

**Device Model (MODEL)**

Specify **0**.

**Advanced Function Printing (AFP)**

Specify ***YES**.

**AFP Attachment (AFPATTACH)**

Specify ***APPC**. CRTPSFCFG overrides this value.

**Font (FONT)**

Enter an appropriate value.

**Form Feed (FORMFEED)**

Specify ***CONT**.

**Remote Location (RMTLOCNAME)**

Enter the remote location name.

## Configuring AFP with CRTPSFCFG on V3R2

In V3R1, WRKAFP2 was used to specify RMTLOCNAME, PORT, and ACTTMR, along with other parameters for PSF. In V3R2, CRTPSFCFG (Create PSF Configuration Object), which replaced WRKAFP2, was used to specify these same parameters, along with other parameters.

The PSF configuration object created with this command is used by PSF/400 when printing IPDS files. The object is used by AS/400 V3R2 only if the object is in the QGPL library and has the same name as the printer device description. This information overrides the APPC configuration information specified in the printer device description.

To configure AS/400 for IPDS printing on V3R2:

1. At the AS/400 command line, enter a command in the form:

```
CRTPSFCFG  PSFCFG(P6400) IPDSPASTHR(*YES)
           RLSTMR(*SEC15) TEXT('IBM 6400 NETWORK
           PRINTER') RMTLOCNAME('128.99.12.134')
           PORT(5001)
```

2. A completed screen looks like Figure 9.

| | | |
|---|---|---|
| **PSF configuration: P6400** | **Library: QGPL** | |
| User resource library . . . . . | : | *JOBLIBL |
| **IPDS pass through . . . . . :** | | ***YES** |
| **Activate release timer . . . . . :** | | ***NORDYF** |
| **Release timer . . . . . :** | | ***SEC15** |
| Restart timer. . . . . | : | *IMMED |
| SNA retry count . . . . . | : | 2 |
| Delay time between retries. . . . . | : | 0 |
| Blank page . . . . . | : | *YES |
| Page size control . . . . . | : | *NO |
| Resident fonts . . . . . | : | *YES |
| Resource retention. . . . . | : | *YES |
| Edge orient. . . . . | : | *NO |
| **Remote location:** | | |
| **Name or address . . . . . :** | | **128.99.12.134** |
| **TCP/IP port . . . . . :** | | **5001** |
| **TCP/IP activation timer . . . . . :** | | **170** |
| PSF defined options: | | |
| **Text description . . . . . :** | | **IBM 6400 Network Printer** |
| Device resource library list: | | *DFT |

**Figure 9. Example CRTPSFCFG Command (V3R2)**

3. The following parameters are required:

**PSF configuration (PSFCFG)**

The name of the printer device you are configuring.

**Library**

Specify **QGPL**.

**IPDS pass through (IPDSPASTHR)**

To print SCS files, specify ***YES**. PSF/400 transforms SCS into IPDS before printing.

**Activate release timer (ACTRLSTMR)**

Specifies the point at which the release timer (RLSTMR) is activated. Set to ***NORDYF**. This means that the release timer is activated when there are no spooled files in the printer's output queue with a status of RDY and the last page of the last spooled file processed has printed. *NORDYF is used so that all files with a status of RDY are printed before releasing the session (which does not terminate the writer, however).

**Release timer (RLSTMR)**

Specifies the amount of time to wait before a session or dialog is released without terminating the writer. The ACTRLSTMR parameter specifies when this timer is to be activated. Set the parameter to a value at least equal to the TIMEOUT value on the printer. IBM recommends ***SEC15**.

**Remote Location name or address (RMTLOCNAME)**

Enter the IP address or hostname of the printer.

**TCP/IP port (PORT)**

Specify **5001**.

**TCP/IP activation time (ACTTMR)**

This value specifies the number of seconds that PSF/400 waits for a printer to respond to an activation request. If only one system is using the printer, use the default value (170 seconds). If more than one system is using the printer, specify ***NOMAX**, which causes PSF/400 to wait indefinitely for a response to an activation request.

## Configuring PSF/400 for IPDS on V3R7 and Above

To configure IPDS on AS/400 V3R7 and above, use the following commands:

- CRTPSFCFG (Optional)
- CRTDEVPRT

### Configuring AFP with CRTPSFCFG on V3R7 or V4R1 (Optional)

New for V3R7 is the ability to specify three TCP/IP-related parameters for PSF in a printer device description: RMTLOCNAME, PORT, and ACTTMR. In V3R2, CRTPSFCFG (Create PSF Configuration Object), which replaced WRKAFP2, was used to specify these same parameters, along with other parameters. In V3R7 and higher, these three parameters are ignored when specified in a PSF configuration object, since they are specified in a printer device description. However, you may wish to use a PSF configuration object to specify other parameters, such as IPDS passthrough, and so on.

The PSF configuration object created with this command is used by PSF/400 when printing IPDS files only if the object is specified with the USRDFNOBJ parameter in the printer device description.

To configure AS/400 for IPDS printing on V3R7 or V4R1:

1. At the AS/400 command line, enter a command in the form:

```
CRTPSFCFG  PSFCFG(AFP/6400NETPRT) IPDSPASTHR(*YES)
           RLSTMR(*SEC15) TEXT('IBM 6400 NETWORK
           PRINTER')
```

2. A completed screen looks like Figure 10.

```
                        PSF Configuration Information
PSF configuration: 6400NETPRT                Library: AFP
User resource library . . . . . .:     *JOBLIBL
IPDS pass through. . . . . .:     *YES
Activate release timer . . . . . .:     *NORDYF
Release timer. . . . . .:     *SEC15
Restart timer . . . . . .:     *IMMED
SNA retry count . . . . . .:     2
Delay time between retries . . . . . .:     0
Blank page. . . . . .:     *YES
Page size control . . . . . .:     *NO
Resident fonts . . . . . .:     *YES
Resource retention. . . . . .:     *YES
Edge orient. . . . . .:     *NO
Remote location:
     Name or address . . . . . .:     *NONE
TCP/IP port . . . . . .:     *NONE
TCP/IP activation timer . . . . . .:     170
PSF defined options:
     *NONE
Text description . . . . . .:     IBM 6400 Network Printer
Device resource library list:     *DFT
```

**Figure 10. Example CRTPSFCFG Command (V3R7 or V4R1)**

**NOTE:** The lines in **bold** in Figure 10 are not used by PSF/400. Instead, PSF/400 uses the information entered in the device description screen.

3. The following parameters are recommended:

**PSF configuration (PSFCFG)**

The name used for this PSF configuration object. The name must match the user-defined object name (USRDFNOBJ) in the printer DEVD.

**IPDS pass through (IPDSPASTHR)**

To print SCS files, specify ***YES**, PSF/400 transforms SCS into IPDS before printing.

**Activate release timer (ACTRLSTMR)**

Specifies the point at which the release timer (RLSTMR) is activated. Set to ***NORDYF**.

**Release timer (RLSTMR)**

Specifies the amount of time to wait before a session or dialog is released without terminating the writer. The ACTRLSTMR parameter specifies when this timer is to be activated. Set the parameter to a value at least equal to the TIMEOUT value on the printer. IBM recommends ***SEC15**.

## Configuring PSF with CRTDEVPRT on V3R7 and Above

This section describes how to create a printer device description.

1. At the AS/400 command line, enter a command in the form:

```
CRTDEVPRT  DEVD(P6400) DEVCLS(*LAN) TYPE(*IPDS)
           MODEL(0) LANATTACH(*IP) AFP(*YES) PORT(5001)
           FONT(11) FORMFEED(*CONT)
           RMTLOCNAME('128.9.12.134')
           USRDFNOBJ(AFP/6400NETPRT *PSFCFG)
           TEXT('IBM 6400 NETWORK PRINTER')
```

**NOTE:** Only use the USRDFNOBJ parameter if it was defined in the previous procedure (see "Configuring AFP with CRTPSFCFG on V3R7 or V4R1 (Optional)" on page 60).

2. A completed screen looks like the example shown in Figure 11.

| Display Device Description | | |
|---|---|---|
| 5716SS1 V3R7M0 961108 | BLDRB1 | |
| **Device Description . . . . . :** | **DEVD** | **P6400** |
| Option . . . . . : | OPTION | *ALL |
| Category of device . . . . . : | | *PRT |
| **Device class. . . . . :** | **DEVCLS** | ***LAN** |
| **Device type . . . . . :** | **TYPE** | ***IPDS** |
| **Device model . . . . . :** | **MODEL** | **0** |
| **LAN attachment. . . . . :** | **LANATTACH** | ***IP** |
| **User-defined object. . . . . :** | **USRDFNOBJ** | **6400NETPRT** |
| Library. . . . . : | | AFP |
| Object type . . . . . : | | *PSFCFG |
| Data transform program . . . . . : | USRDTATFM | *NONE |
| User-defined driver program . . . . . : | USRDRVPGM | *NONE |
| Advanced function printing . . . . . : | AFP | *YES |
| **Port number. . . . . :** | **PORT** | **5001** |
| Online at IPL . . . . . : | ONLINE | *YES |
| **Font. . . . . :** | **FONT** | |
| **Identifier . . . . . :** | | **011** |
| **Point size. . . . . :** | | ***NONE** |
| **Form feed. . . . . :** | **FORMFEED** | ***CONT** |
| Separator drawer. . . . . : | SEPDRAWER | *FILE |
| Separator program . . . . . : | SEPPGM | *NONE |
| Library. . . . . : | | |
| Printer error message . . . . . : | PRTERRMSG | *INQ |
| Message queue. . . . . : | MSGQ | QSYSOPR |
| Library. . . . . : | | *LIBL |
| **Activation timer . . . . . :** | **ACTTMR** | **170** |
| Maximum pending requests . . . . . : | MAXPNDRQS | 6 |
| Print while converting . . . . . : | PRTCVT | *YES |
| Print request timer . . . . . : | PRTRQSTMR | *NOMAX |
| Form definition. . . . . : | FORMDF | F1C10110 |
| Library. . . . . : | | *LIBL |
| **Remote location . . . . . :** | **RMTLOCNAME** | |
| Name or address . . . . . : | | 128.9.12.134 |
| Dependent location name . . . . . : | DEPLOCNAME | *NONE |
| Text . . . . . : | TEXT | IBM 6400 Network Printer |
| User-defined options . . . . . : | USRDFNOPT | |

**Figure 11. Example CRTDEVPRT Command (V3R7 and above)**

3. Values must be entered for the following parameters:

**Device Description (DEVD)**

The device description or name.

**Device Class (DEVCLS)**

Specify ***LAN**.

**Device Type (TYPE)**

Specify ***IPDS**.

**Device Model (MODEL)**

Specify **0**.

**LAN attachment (LANATTACH)**

Specify ***IP**.

**Port number (PORT)**

Specify **5001**.

**Font (FONT)**

Enter an appropriate value.

**Form Feed (FORMFEED)**

Specify ***CONT**.

**Activation timer (ACTTMR)**

This value specifies the number of seconds that PSF/400 waits for a printer to respond to an activation request. If only one system is using the printer, use the default value (170 seconds). If more than one system is using the printer, specify ***NOMAX**, which causes PSF/400 to wait indefinitely for a response to an activation request.

**Remote Location (RMTLOCNAME)**

Enter the IP address or hostname of the printer.

**User-Defined Object (USRDFNOBJ)**

To use a PSF configuration object, specify its name and library here. This object type must be ***PSFCFG**. For V3R7 and higher, a single PSF configuration object may be referenced by multiple device descriptions, if required.

# Verifying the IPDS Configuration on AS/400

To test IPDS printing:

1. If it is not already on, vary on the line description:
   **VRYCFG CFGTYPE(*LIN)**
2. To start TCP/IP, enter **STRTCP**.
3. Verify that the AS/400 TCP/IP interface is active. Use the command:
   **WRKTCPSTS**
   and then select option 1.
4. Turn the printer on and wait until the printer operator panel displays "ETHERNET ADAPTER IS READY".
5. To verify the printer is connected to AS/400, "**ping**" the printer from an AS/400 workstation with one of the following commands:
   **PING *'ip_address'***
   or
   **PING *hostname***

   Where ***ip_address*** is the Internet address of the remote system printer (the NIC), and ***hostname*** is the hostname you defined for the printer, if any.
6. If the "**ping**" is not successful, refer to "Printer Cannot Be PINGed" on page 70.
7. If the "**ping**" is successful, vary on the printer device description with the command:
   **VRYCFG (*printer_device*) CFGTYPE(*DEV) STATUS(*ON)**

8. To use PSF/400 to send an IPDS file to the printer, enter:
   **STRPRTWTR DEV (*printer_device*)**
   where ***printer_device*** is the name of the printer.

If you have problems printing, do the following:

- Print an Ethernet Test Page. Refer to your *Setup Guide*.
- Verify that port number 5001 is being used.

If you are still unable to print IPDS files, contact IBM Support.

# Sharing the AS/400 Printer on the Network

To support printer sharing, IBM 6400 network printers automatically switch among all attached ports (serial port, the twinax or coax port, or the LAN network port). Basically, the printer prints jobs for one port until no new jobs appear and the port “times out”. The printer then switches to the next port and does the same thing.

To change the default “time out” value for a port, update the TIMEOUT value for the port on the appropriate menu (Serial Interface, Ethernet Parameters, Twinax Interface, or Coax Interface).

## Printer Sharing Parameters

To set up AS/400 for printer sharing, set the following parameters.

**Table 4. Printer Sharing**

| AS/400 Version | Where Set | Parameter | Recommended Value | Description |
|---|---|---|---|---|
| V3R2 | CRTPSFCFG<br>CHGPSFCFG | RLSTMR | *NORDYF | Specifies the point at which the release timer (RLSTMR) is activated. Set to *NORDYF. This means that the release timer is activated when there are no spooled files in the printer’s output queue with a status of RDY and the last page of the last spooled file processed has printed. *NORDYF is used so that all files with a status of RDY are printed before releasing the session (which does not terminate the writer). |

**Table 4. Printer Sharing (continued)**

| AS/400 Version | Where Set | Parameter | Recommended Value | Description |
|---|---|---|---|---|
| V3R2 | CRTPSFCFG<br>CHGPSFCFG | ACTRLSTMR | *SEC15 | Specifies the amount of time to wait before a session or dialog is released without terminating the writer. The ACTRLSTMR parameter specifies when this timer is to be activated. Set the parameter to a value at least equal to the TIMEOUT value on the printer. IBM recommends *SEC15. |
| V3R2 | CRTPSFCFG<br>CHGPSFCFG | ACTTMR | *NOMAX | The value specifies the number of seconds that PSF/400 will wait for a printer to respond to an activation request. If only one system will be using the printer, use the default value (170 seconds). If more than one system will be using the printer, set the value to *NOMAX, which causes PSF/400 to wait indefinitely for a response to an activation request. |
| V3R7<br>V4R1 | CRTPSFCFG<br>CHGPSFCFG | ACTRLSTMR | *NORDYF | Specifies the point at which the release timer (RLSTMR) is activated. Set to *NORDYF. This means that the release timer is activated when there are no spooled files in the printer's output queue with a status of RDY and the last page of the last spooled file processed has printed. *NORDYF is used so that all files with a status of RDY are printed before releasing the session (which does not terminate the writer). |

**Table 4. Printer Sharing (continued)**

| AS/400 Version | Where Set | Parameter | Recommended Value | Description |
|---|---|---|---|---|
| V3R7<br>V4R1 | CRTPSFCFG<br>CHGPSFCFG | RLSTMR | *SEC15 | Specifies the amount of time to wait before a session or dialog is released without terminating the writer. The ACTRLSTMR parameter specifies when this timer is to be activated. Set the parameter to a value at least equal to the TIMEOUT value on the printer. IBM recommends *SEC15. |
| V3R7<br>V4R1 | CRTDEVPRT<br>CHGDEVPRT | ACTTMR | *NOMAX | The value specifies the number of seconds that PSF/400 will wait for a printer to respond to an activation request. If only one system will be using the printer, use the default value (170 seconds). If more than one system will be using the printer, set the value to *NOMAX, which causes PSF/400 to wait indefinitely for a response to an activation request. |

# AS/400 Troubleshooting

Use this section to resolve problems configuring AS/400 on TCP/IP networks.

## Printer Cannot Be PINGed

If you have problems "**`ping`**"-ing the printer:

- Verify the configuration of AS/400, including the printer and any intervening devices such as routers and bridges.
- Verify that the AS/400 line description is varied on and the printer is turned on and displays a status of READY.
- Verify that the AS/400 TCP/IP interface is active.

## PSF/400 Terminates When Initialized

If PSF/400 terminates when you initialize it for IPDS printing and issues message PQT3603, check for the following error codes:

- Code **10** means an incorrect RMTSYS (V3R1 or V3R6) or RMTLOCNAME (V3R2, V3R7, or V4R1) has been specified for the printer.
- Code **15** means that PSF/400 timed out waiting for the printer's response. You should check the value you entered for Activation Timer when using WRKAFP2 (V3R1 or V3R6), CRTPSFCFG (V3R2), or CRTDEVPRT (V3R7 or V4R1).
- Codes **20-39** indicate a general communications failure. Make sure all of the components in your network are operational, such as routers. If necessary, call IBM Technical Support.
- Codes **40-59** indicate a logic error between PSF and the printer control unit. Contact IBM support.

## Spooled Print File Remains in PND Status

Check the output queue with the command:

**WRKOUTQ *queuename***

This typically indicates that PSF/400 is waiting for a response from the printer. This can be verified by displaying the QSPL subsystem, WRKACTJOBSBS (QSPL). If the status of the PDJ job for the printer is SELW, then PSF/400 is waiting for a response from the printer. Make sure that the printer is online and in READY status and that all network connections (for example, routers) between the AS/400 and the printer are active.

## Spooled Files Disappear Without Printing

To resolve this problem:

- Check that the correct printer queue name and correct IP address have been used.
- "**ping**" the IP address. If the "**ping**" is successful, disconnect the network cable from the printer/print server, and "**ping**" the address again. If the "**ping**" is still successful, there is another printer with that IP address on the network.

## Data is Being Clipped

To resolve this problem, you may want to set the PSC (Page Size Control) parameter to *YES in the CRTPSFCFG command (V3R2, V3R7, or V4R1).

# Chapter 5 AS/400 Troubleshooting

# 6 *Windows Configuration*

## Overview

This chapter details a complete Windows** configuration setup including:

1. Identifying the Ethernet Interface on the network using TCP/IP as the underlying protocol.
2. Configuring the Ethernet Interface with its mandatory TCP/IP settings (IP address and subnet mask).
3. Configuring a new printer on the Windows station.

## Windows Environment Description

The Ethernet Interface supports network printing under Windows environments by using TCP/IP. In a Windows NT** setup, pure TCP/IP is used as the network protocol whereas with Windows 95**, NetBIOS over TCP/IP is used.

Figure 12 shows two of the most common Windows setups you will see with the Ethernet Interface. The ideal configuration is a network printer defined on the NT server to be shared by Windows 95 clients. However, any Windows station can also go directly to the Ethernet Interface.

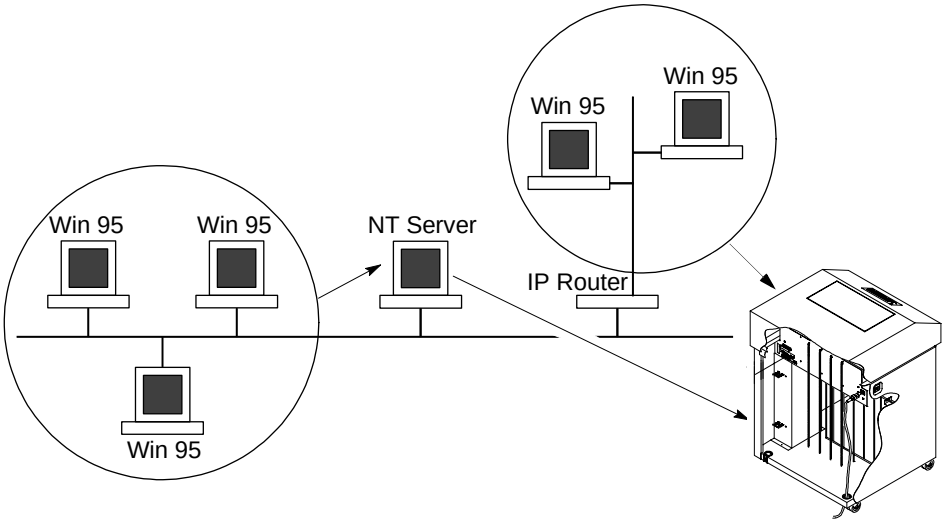



**Figure 12. Windows Integration**

# Windows Ethernet Interface Configuration

The IP address and subnet mask are mandatory TCP/IP settings and are needed before the print server can be detected on the network. There are also additional settings which are optional. This section offers alternative methods for configuring your Ethernet Interface in a Windows environment and mentions some of the more common optional settings available.

## Mandatory

Since TCP/IP is used for Windows printing, the Ethernet Interface must be configured with a minimum of an IP address and subnet mask before it can be seen on the network. To configure the IP address and subnet mask using the operator panel, see “Configuration Tools” on page 21.

## Optional

Additional settings, like routing entries, can be configured. This allows communication across subnets.

Configuration of the Ethernet Interface can be done from the printer operator panel, Web browser, or host commands. To configure these options, see “Configuration Tools” on page 21.

## Configuration Using ARP

To configure the Ethernet Interface with its IP settings using a manual “**arp**” command:

1. Log on to a Windows station with TCP/IP loaded and located on the same subnet as the Ethernet Interface.
2. Find the Ethernet address (MAC Address) for the Ethernet Interface on the configuration printout. It must be entered as part of this procedure.
3. Use the “**arp**” command to add an entry into the Windows station ARP table for the Ethernet Interface. This is the most common syntax for this command:

Syntax:

**arp -s *ipaddress ethernetaddress***

Example for Microsoft** TCP stacks:

**arp -s 192.75.11.9 00:80:72:07:00:60**

This example specifies an Ethernet Interface using IP address **192.75.11.9** and Ethernet address **00:80:72:07:00:60**.

4. Check to see if the ARP entry was accepted.

**arp -a**

You should see an entry in the listed ARP table with the IP address and Ethernet address specified in Step 3.

5. Try to “**ping**” this IP address to see if the Ethernet Interface can be seen on your network.

At this point, you should be able to communicate with the Ethernet Interface from your local Windows station. This means the print server knows about an IP address and subnet mask and has these settings in its current memory. However, if the Ethernet Interface is power cycled, these settings will disappear unless you store them into flash memory. To do this:

1. Load a Web browser on your Windows station and direct it to the URL "**`http://EthernetInterfaceIPaddress/networkConf.html`**" (e.g. "**`http://192.75.11.9/networkConf.html`**").

**NOTE:** If prompted for a "User ID" and password first, type "**`root`**" for the ID and press ENTER at the password prompt since there is no password by default.

2. At the "Network Configuration" HTML form that displays, click in the field below the "IP Address" heading and type in the IP address for the Ethernet Interface.
3. Under the "Subnet Mask" heading, enter the Ethernet Interface subnet mask.

**NOTE:** If you would like to communicate with the Ethernet Interface from across routers, you will need to fill in an entry within the "Routing" section. Please see "Communicating Across Routers" on page 77 for more details.

4. Click on the SUBMIT button when done and physically repower the printer to make the new settings take effect.

## Communicating Across Routers

Since Windows environments rely on TCP/IP to communicate with the Ethernet Interface, crossing routers becomes an issue.

After following one of the Ethernet Interface configuration methods mentioned, you will most likely only be able to communicate with the print server from the same subnet. This means any hosts across a router will not be able to see your Ethernet Interface. In order for hosts across a router to see your Ethernet Interface, it is best to store a default router/ gateway within the print server so that any packets destined for another subnet get forwarded to this router automatically. The router (or series of routers) can then take over ensuring the packets get to their final destination on another subnet on your network.

To configure a default router/gateway within the Ethernet Interface:

1. Load a Web browser on your Windows station and direct it to the URL "**`http://EthernetInterfaceIPaddress/networkConf.html`**" (e.g. "**`http://192.75.11.9/networkConf.html`**").

**NOTE:** If prompted for a "User ID" and password first, type in "**`root`**" for the ID and press ENTER at the password prompt since there is no password by default.

2. At the "Network Configuration" HTML form that displays, click in the first field below the "Gateway" heading and type in the IP address of the default router/gateway for the Ethernet Interface subnet.
3. Click on the SUBMIT button when done and physically repower the print server to make the new settings take effect.

## Changing Workgroup Names

Windows environments define groups of related computers as "workgroups." By default, the Ethernet Interface belongs to the workgroup called "WORKGROUP". However, you may want to change this to suit your network better. To do this:

1. Load a Web browser on your Windows station and direct it to the URL "**`http://EthernetInterfaceIPaddress/networkConf.html`**" (e.g. "**`http://192.75.11.9/networkConf.html`**").

**NOTE:** If prompted for a "User ID" and password first, type in "**`root`**" for the ID and press ENTER at the password prompt since there is no password by default.

2. At the "Network Configuration" HTML form that displays, search for the "Windows (NetBIOS TCP/IP)" section and highlight the "Workgroup Name" field.
3. Type in the new workgroup name for the Ethernet Interface.
4. Click on the SUBMIT button when done and physically repower the print server to make the new settings take effect.

## Changing Destination Names

When defining some printers within Windows environments, the Ethernet Interface requires that you specify a pre-defined destination rather than any name you would like. For example, when creating a new printer under Windows NT, you are presented with a screen similar to Figure 13.

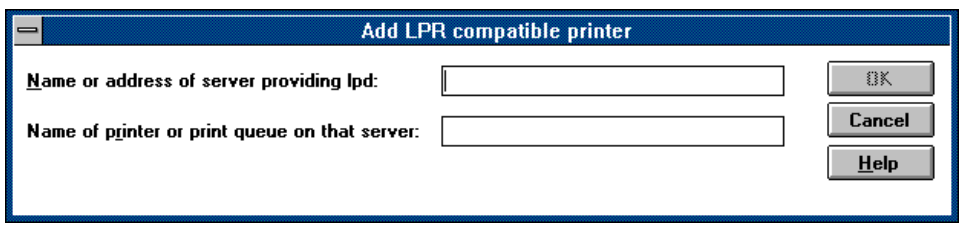



**Figure 13. Windows NT Print Setup Dialogue Box**

The first field requires the IP address for the Ethernet Interface and the second field must be filled in with an existing destination from the print server (e.g. d1prn). Otherwise, the Ethernet Interface will not accept this as a valid network printer. Table 5 outlines the default destinations to choose from.

**Table 5. Ethernet Interface Default Destinations**

| Destination | Mapped I/O Port |
|---|---|
| d1prn | PRN |
| d2prn | PRN |
| d3prn | PRN |
| d4prn | PRN |

**NOTE:** When the IPDS feature is installed, queue name **d4prn** is not available.

This name can be changed to something more meaningful using the built-in HTML forms. To do this:

1. Load a Web browser on your Windows station and direct it to the URL "**`http://EthernetInterfaceIPaddress/destConf.html`**" (e.g. "**`http://192.75.11.9/destConf.html`**").

**NOTE:** If prompted for a "User ID" and password first, type in "**`root`**" for the ID and press ENTER at the password prompt since there is no password by default.

2. At the "Print Path Configuration" HTML form that displays, select a destination link from the top of the page to bring up the appropriate destination form. By default, you should see a line near the top of the form showing the destinations listed in Table 5.
3. Once the desired destination HTML form displays, highlight the "Name" field and type in the new name for this destination.
4. Click on the SUBMIT button when done and physically repower the print server to make the new setting take effect.

# Windows Host Configuration

This section covers Windows NT, Windows 95 and Windows 3.1 new printer setups.

## Windows NT 3.51 Host Setup

To configure a new printer on a Windows NT 3.51 station:

1. Open the “Control Panel.”
2. Double click on “Printers.”
3. Select “Create a Printer” from the “Printer” menu to display the dialogue box in Figure 14.

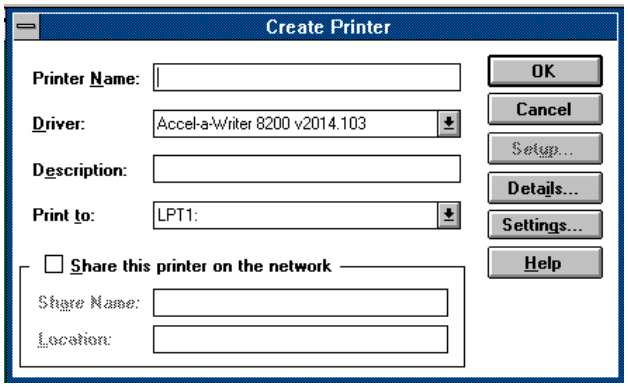



**Figure 14. Create a Printer Dialogue Box**

4. Define a name to represent this print setup and select the appropriate driver for the printer that will be used in this setup. For printer driver choose “generic text” or Epson “FX1050” or “Proprinter” based on print need.
5. Under the “Print To” field, select “Other...”

6. Select “LPR Port” from the list that displays and click OK to bring up a dialogue box similar to the one found in Figure 15.

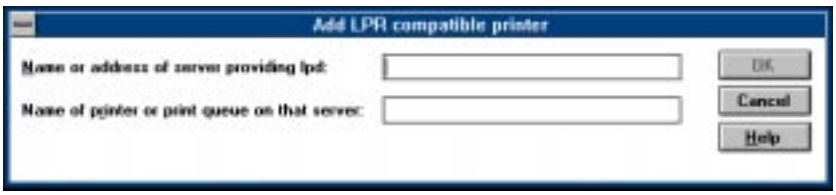



**Figure 15. Add LPR Compatible Printer Dialogue Box**

7. Type in the IP address or host name of the Ethernet Interface in the first field.
8. Type in the name of a pre-defined destination/queue on the Ethernet Interface in the second field.

**NOTE:** This name must be a name of an existing destination/queue on the Ethernet Interface and it must be lowercase by default. You will probably use “**`d1prn`**”.

**NOTE:** When the IPDS feature is installed, queue name **d4prn** is not available.

9. Click OK when done specifying these two fields.

You now have a new network printer which relies on the standard TCP/IP print protocol, LPD, to print remotely to a printer with the Ethernet Interface.

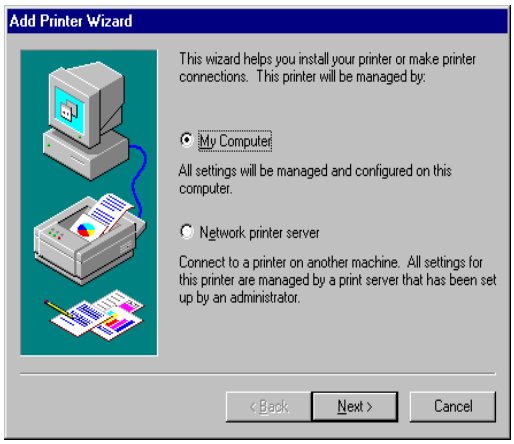
## Windows NT 4.0 Host Setup

This installation procedure assumes that the Ethernet Interface adapter is configured with the correct IP address, subnet mask and gateway (if required). In addition, the administrator can “**`ping`**” and telnet to the Ethernet Interface adapter from the server console.

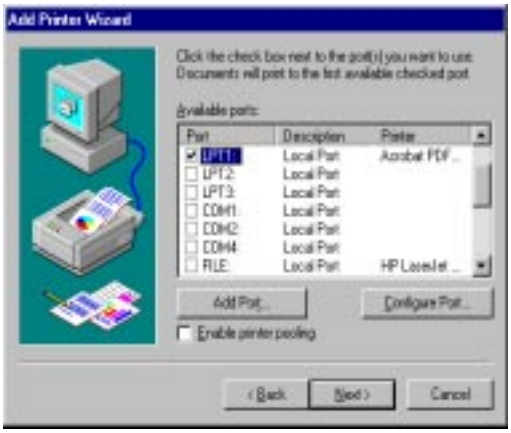
If this is not the case, use the printer front panel or the IPAssign utility to configure the Ethernet Interface adapter before proceeding.

1. Select “Settings:Printers” from the “Start” menu.

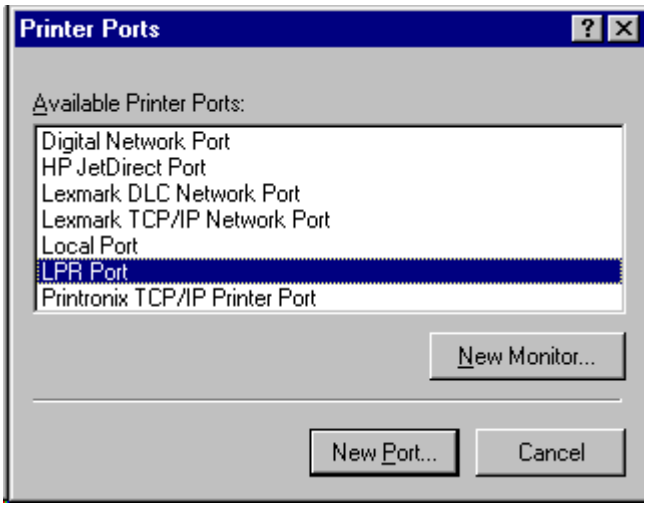
2. Double click on the “Add Printer” icon. The “Add Printer Wizard” window is displayed.



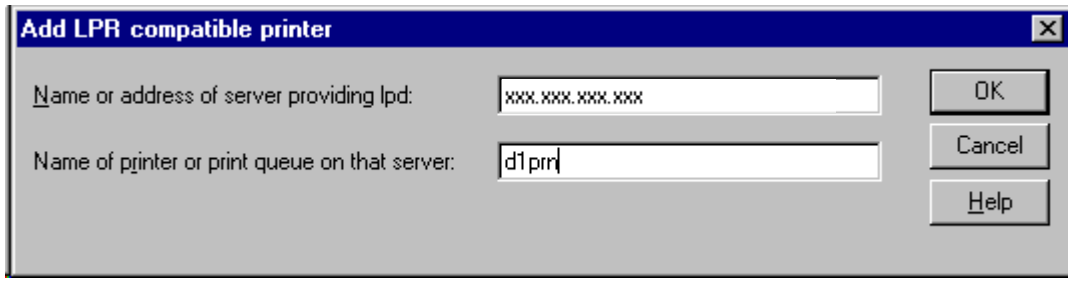

3. Select “My Computer”.




4. At the next window, click on “Add Port ...”.

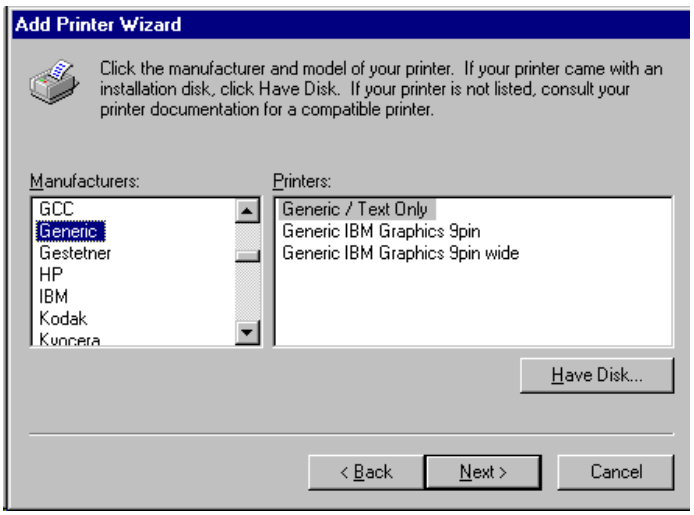



5. Double click on “LPR Port”. If LPR Port is not listed it means that Microsoft TCP/IP Printing service is not installed.

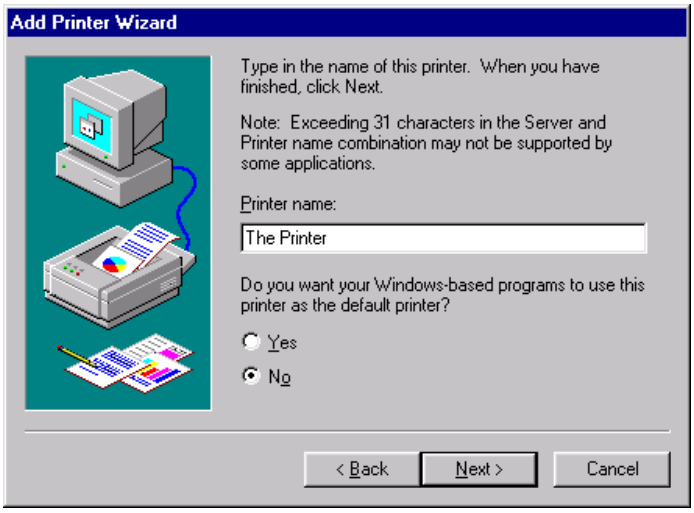



6. In the “Name or address of server providing lpd:” box, enter the IP address of the Ethernet Interface adapter. In the “Name of printer or print queue on that server:” box, enter **d1prn**.

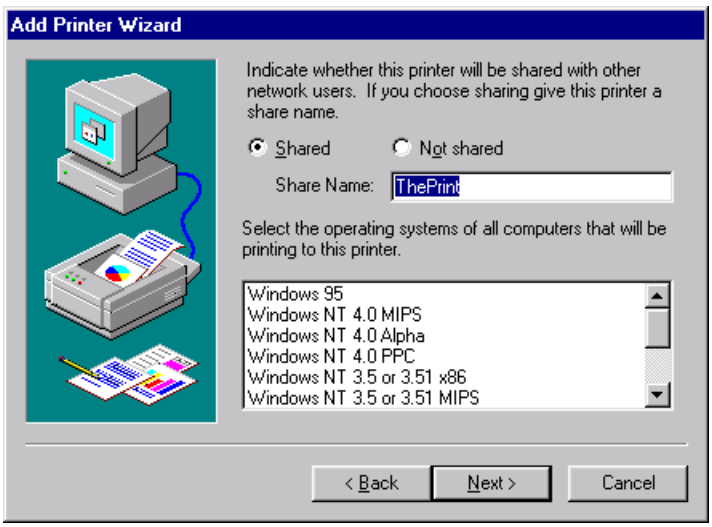
**NOTE:** When the IPDS feature is installed, queue name **d4prn** is not available.



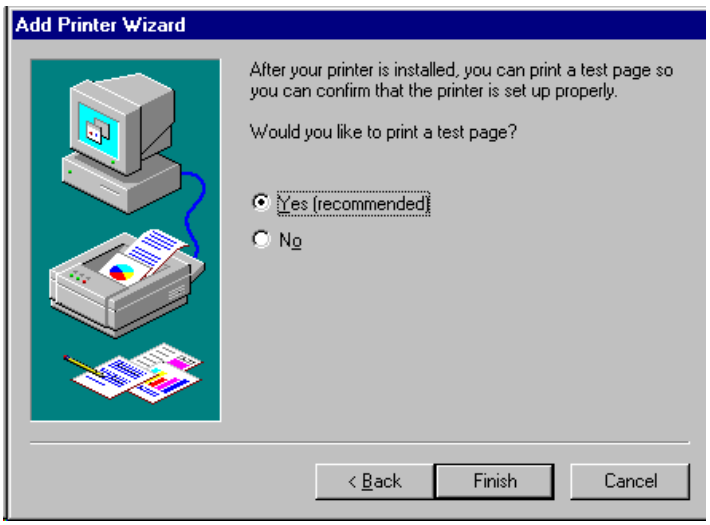

7. Select the “Generic/Text only” printer driver or install the 6400 driver. The generic driver is good for troubleshooting installation problems. The network administrator can always go back and install the 6400 driver at a later time.




8. In the “Printer Name” box, enter a name for this printer.




9. Determine if the printer is shared with other network users. If it is shared, the share name and the operating system must be selected.




10. Print a Windows test page.
11. If there are any problems during or after installation, see “Windows NT 4.0 Host Setup Problems” on page 94.

## Windows 95 Host Setup

To configure a new printer on a Windows 95 station:

**NOTE:** Testing has shown that using the following Windows 95 host setup can lead to print job/data loss if the printer is offline for longer than approximately 45 seconds. An alternative method for printing using LPR on Windows 95 is given on page 87.

1. Select “Settings:Printers” from the “Start” menu.
2. Double click on the “Add Printer” icon.
3. Select “Network Printer” from the second window of the “Add Printer” wizard that loaded.
4. At the next window, click on BROWSE to help fill in the network path of this printer.
5. At the “Browse for Printer” dialogue box that displays, double click on the appropriate workgroup containing the Ethernet Interface. By default, the print server falls under the workgroup, “WORKGROUP.”
6. Continue searching the network until you see the Ethernet Interface name, “M_*xxxxxx*”, where “*xxxxxx*” equals the last six digits of the print server Ethernet address found when a configuration is printed.
7. Once you see the Ethernet Interface, double click on it to display a list of pre-defined destinations/queues to choose from.
8. Select a destination/queue that will use “**`d1prn`**”.

**NOTE:** When the IPDS feature is installed, queue name **d4prn** is not available.

9. Click OK once you have selected a destination.
10. Back at the network path window, select NEXT since this path should now be filled in for you.
11. At the next window, select the appropriate print driver and click on NEXT.
12. Fill in a name for this new network printer at the next window and decide if you want this to be the default printer. This printer name can be anything you would like as long as it is unique.

13. When prompted for a test page, select either “Yes” or “No” depending on the state of the attached printer and click on FINISH.

**NOTE:** Windows may ask for a disk or CD-ROM to load the appropriate printer driver to complete this new printer setup.

There should now be a new printer icon within the “Printers” folder. This new network printer relies on NetBIOS over TCP/IP as the underlying protocol to print to the Ethernet Interface.

### Alternative Windows 95 Host Setup for LPR

To configure a new printer on a Windows 95 station to use LPR over TCP/IP:

1. Go to the Web site **http://www.printers.ibm.com/util.html** and follow the instructions in the section titled *IBM Remote Printing Client for Windows 95* to download and install the LPR software.
2. After the LPR port and help files are installed, use the Help instructions to create a printer which uses an LPR port to print to the 6400. You will need to provide the IP address or hostname of the printer network card as well as one of the internal print queue names on the card (e.g. **d1prn**).

**NOTE:** When the IPDS feature is installed, queue name **d4prn** is not available.

There should now be a new printer icon within the “Printers” folder. This new network printer relies on LPR over TCP/IP as the underlying protocol to print to the Ethernet Interface.

## Windows 3.1 Host Setup

If you are running Windows 3.1 stations on your network, you will need to rely on either TCP/IP or IPX to print to the Ethernet Interface. If IPX is used, you will have a print queue defined on a Novell file server which your Windows 3.1 stations will send their print jobs to. The Ethernet Interface will then service this print queue as either a PSERVER or an RPRINTER. Please see Chapter 8, “Novell Configuration”, for further details.

If you want to rely on TCP/IP, you will need a third party TCP stack loaded onto your Windows station since TCP/IP support did not automatically come with Windows until the introduction of Windows NT and Windows 95. You may also be running a third party stack if you decided not to use a Microsoft operating system.

Some common TCP stacks are FTP Software's** OnNet**, NetManage's** Chameleon**, and Frontier Technologies'** SuperTCP**. In each case, they allow your Windows 3.1 station to communicate with other TCP/IP devices. This means you can send print jobs to the Ethernet Interface as well.

The most common print method offered with Windows TCP stacks is LPR/LPD, a multi-platform remote printing protocol used on everything from PCs to mainframes. The LPR print setup is very simplistic, involving only two parameters:

1. **Ethernet Interface IP address.** The IP address or host name of the print server you want to print to.
2. **Ethernet Interface destination/queue.** A pre-defined name on the print server telling the device which I/O port to send the jobs to. The standard name for the PRN port is "**`d1prn`**".

**NOTE:** This destination name is case sensitive and by default, all names are lowercase. When the IPDS feature is installed, queue name **d4prn** is not available.

# Windows Troubleshooting Tips

**NOTE:** During Power Up, the printer performs an interface hardware test. The presence of the Ethernet Interface menu selections at the printer operator panel indicates that the Ethernet Interface hardware is functioning properly. See the *Setup Guide* for configuration menu information.

This section provides information on possible solutions to some standard configuration errors. If you require technical support, please have as much of the following information as you can available when you call:

1. What level of software are you running?
2. What type of attachment do you have?

3. What is your host operating system?
4. Give a detailed description of the problem.
5. How often, and when, does the problem occur?
6. Give a detailed description of your network and the components attached.

Please follow these tips to determine what the problem may be with your Ethernet Interface configuration.

## Ethernet Interface Will Not Talk on the Network

- Have you assigned the Ethernet Interface a unique and valid IP address which corresponds with the other IP addresses on your network? For example, are you sure no other device is using this IP address?
- Are you sure you are trying to talk to the Ethernet Interface from a Windows station on the same subnet? Currently, the print server can only be seen locally unless you configured a routing entry earlier.
- If you look at the back of the printer, is the STAT LED flashing once a second or is it quicker than that? A slower, once-a-second rate tells you that the print server is in fact configured with an IP address. A faster rate says it knows nothing about this so you may need to try the configuration process again.

**DANGER:**

| | |
|---|---|
| **<4>** | **Do not connect or disconnect any communication port, teleport, attachment connector, or power cord during an electrical storm.** |
| **<5>** | **Power off the printer and disconnect the power cord before connecting or disconnecting communication port, teleport, or attachment cable connector.** |

- Have you confirmed that the network connection to the Ethernet Interface is working correctly? Trying different network cables and locations will help narrow down the problem.

## HTML Configuration Forms Will Not Display

- Can you "**`ping`**" the Ethernet Interface from your Windows station? If not, please refer to "Ethernet Interface Will Not Talk on the Network" above.
- Have you used the correct URL for the Ethernet Interface homepage? It should be "**`http://EthernetInterfaceIPaddress`**" (e.g. "**`http://192.75.11.9`**").

## Errors Occur when Defining an LPR Printer

- Can you "**`ping`**" the Ethernet Interface from your Windows NT station? If not, please refer to "Ethernet Interface Will Not Talk on the Network" above.
- Did you specify the correct IP address or host name for the Ethernet Interface in the first field of the "Add LPR Compatible Printer" box?
- Did you specify a valid destination/queue on the Ethernet Interface in the second field of the "Add LPR Compatible Printer" dialogue box? If so, did you also enter it in lowercase letters?

## Can Not Browse the Ethernet Interface on the Network

- Have you looked under the right Windows workgroup? By default, the Ethernet Interface will be found under "WORKGROUP."
- Are you able to browse other Windows stations and devices on the network from this same station?
- Has this Windows station been given enough time to update its registry so it can see this newly added workgroup device? Sometimes Windows stations can take considerable time, depending on the size of the network.

## Printer Errors when Printing or No Output

- Is there a large job currently printing taking up all of the printer resources? Usually when printing from Windows 95 stations, a busy printer can cause Windows to display a printer error message. This is because it demands immediate printer attention rather than holding the data until the printer is ready again. The best way around this is to use a central spooling station like an NT server.
- Have you tried restarting the spooler under “Control Panel:Services”? Sometimes this is needed to get printing started.

**NOTE:** As a last resort, you may want to reboot the Windows station. Sometimes this is the only option to completely clear this situation. The Ethernet Interface usually has nothing to do with this problem.

## TCP/IP Access Problem

If you can “**`ping`**” the printer from a workstation, but you cannot Web browse, Telnet, or print to the printer through the Ethernet Interface, there may be an incorrect entry in the TCP access list. In order for this workstation to use the Ethernet Interface in this case, one of two things must happen.

1. The TCP list must have an entry added to grant access to this workstation.
2. All entries must be deleted from the TCP list to grant all workstations/ hosts access to the above TCP services.

To view the current access list:

Use the printer operator panel to access the configuration menu (see the *Setup Guide* for configuration menu information). From the DIAGNOSTICS/Printer Tests menu choose the Ethernet Test Page. When the page prints, look under the “TCP ACCESS TABLE” section for the TCP access list entries.

To add/delete a TCP access list entry, refer to “TCP Access Lists” on page 179.

**NOTE:** When the following procedure is used, the TCP access list will be cleared but all IP addresses will need to be entered again after the procedure is complete.

To reset all TCP/IP values to the factory defaults when access is impossible:

1. Obtain a printer configuration printout using the operator panel. See the *Setup Guide* for configuration menu information.
2. Power off the printer.
3. On the Ethernet Interface, place SWITCH 2, the center switch, in the down position.
4. Power on the printer and wait for the READY state.
5. On the Ethernet Interface, place SWITCH 2, the center switch, in the up position.
6. From a workstation attached to this network segment, create an ARP entry. The Ethernet Interface IP address and hardware or MAC address are needed. At the workstation enter:

```
arp -s <ipaddress> <MACaddress>
ping <ipaddress>
```

7. Try to "**ping**" this IP address to see if the Ethernet Interface can be seen on your network. If the interface does not respond, verify you are on the same network segment as the printer and that the ARP entry was created.
8. Telnet into the Ethernet Interface using the same IP address as above. Log in as root with no password.
9. At the system prompt, enter:

```
store tcpip from default
config http on
reset
```

**NOTE:** This will reset all TCP/IP settings to factory default and reset the Ethernet Interface.

10. Wait five minutes for the Ethernet Interface to reset.
11. Power the printer off and then back on.
12. Wait for the "ETHERNET ADAPTER IS READY" message to display.

13. Set the IP address, subnet mask, and default gateway parameters to the desired values. (see “Configuration Tools” on page 21).

## Web Browser/HTTP Problem

In some cases you may not be able to browse the printer web page simply because the Ethernet Interface HTTP may be turned off.

If you can not “**ping**” the Ethernet Interface IP address, make sure the IP Address, subnet mask, and default gateway are set correctly by checking the Ethernet Parameters menu from the operator panel. See the *Setup Guide* for configuration menu information.

If you can “**ping**” the Ethernet Interface IP address but can not access the web pages, perform the following procedure to verify the Ethernet Interface HTTP is turned on.

1. Telnet into the Ethernet Interface and log in as root with no password.
2. At the system prompt enter the following commands:

```
config http on
save
reset
```

3. After approximately 5 minutes, point your browser to the Ethernet Interface IP address. The printer web pages should now be accessible.

If you are still experiencing difficulty accessing or browsing the printer, contact technical support for further assistance.

## Windows NT 4.0 Host Setup Problems

The installation procedure covered earlier in this chapter assumes that the Ethernet Interface adapter is configured with the correct IP address, subnet mask and gateway (if required), and that the administrator can "**`ping`**" and telnet to the Ethernet Interface adapter from the server console. If this is *not* the case, use the printer front panel or the IPAssign utility to configure the Ethernet Interface adapter before proceeding.

The Ethernet Interface installation for Windows NT 4.0 also requires "Microsoft TCP/IP Printing" service on the server. To install this service, click on the Network icon in the Control Panel and click on the "Services" tab. Click on "Add Service" and select "Microsoft TCP/IP printing".

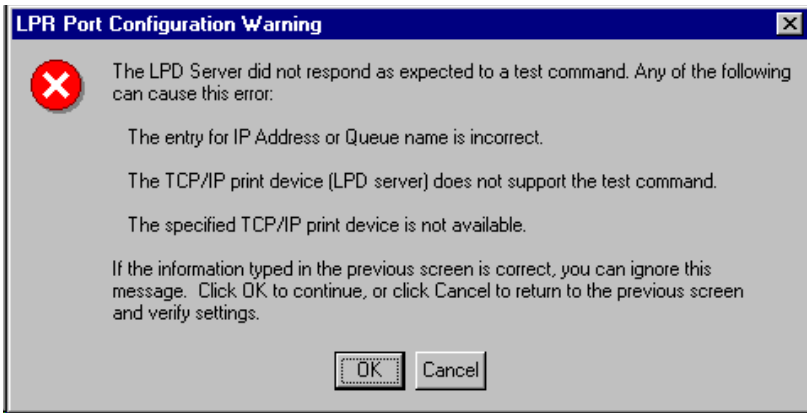
- Are you logged in as the "Administrator"?

  This installation requires administrator privileges.

- "LPR port" is not listed in step 5.

  Cancel the installation and install Microsoft TCP/IP printing service on the server.

- LPR configuration warning during step 6.




  The Ethernet cable is not plugged in, or printer is not turned on. This message is a communication failure between the NT server and the Ethernet Interface card. Check cabling, IP address settings, gateway, etc.

- Test page does not print or prints garbage.
  1. Is the printer online? Re-send test page.
  2. The print queue name in step 6 should be “d1prn”; however, the name can be changed. To verify the queue names, print an Ethernet Test Page. Refer to your *Setup Guide* for information.

**NOTE:** When the IPDS feature is installed, queue name **d4prn** is not available.

  3. The Printronix NT print driver requires P-Series emulation active on the printer. The Generic/Text driver should print in any printer emulation.
  4. Delete then re-install Microsoft TCP/IP Print service on the server.

# Chapter 6 Windows Troubleshooting Tips

# 7 *Unix Configuration*

## Overview

This chapter details a complete Unix** setup including:

1. Configuring the Ethernet Interface with its mandatory TCP/IP settings (i.e. IP address and subnet mask).
2. Configuring the Unix host station with a new printer.

## Unix Environment Description

The Ethernet Interface supports network printing under various TCP/IP environments including all variations of Unix. Printing can come from multiple hosts directly or through central spooling machines. Figure 16 illustrates this.

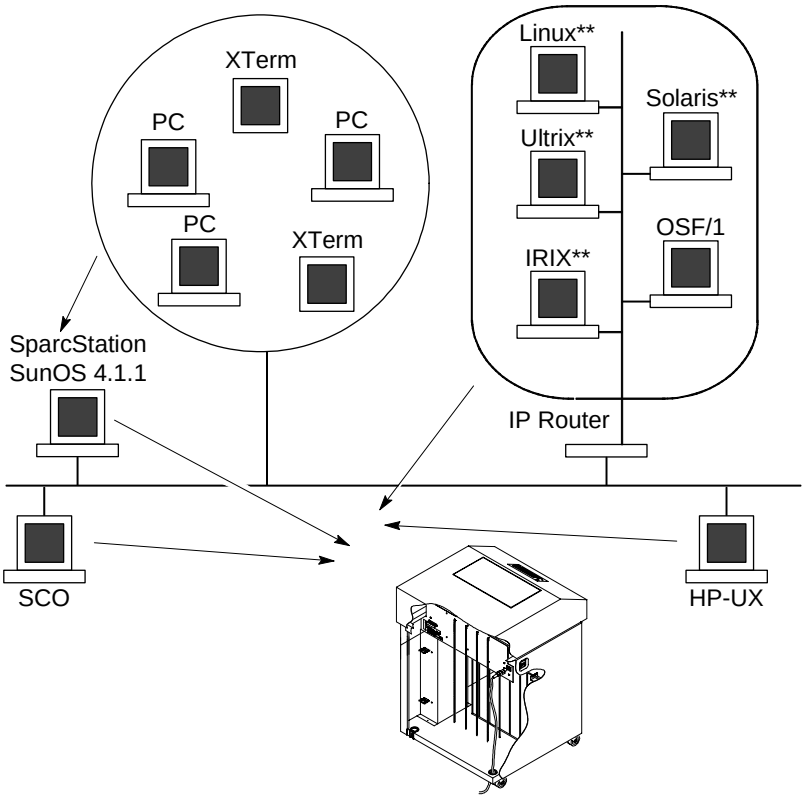



**Figure 16. Unix Integration**

# Unix Ethernet Interface Configuration

There are mandatory settings needed before the print server can be detected on the network, as well as some additional optional settings. This section offers alternative methods for configuring your Ethernet Interface and mentions some of the more common optional settings available.

## Mandatory

Since TCP/IP is used, the Ethernet Interface must be configured, at a minimum, with an IP address and subnet mask before it can be seen on the network. To configure the IP address and subnet mask, see “Configuration Tools” on page 21.

## Optional

Additional settings, like routing entries, can be configured allowing for communication across subnets. Configuration of the Ethernet Interface can be done from the operator panel or through host commands. See “Configuration Tools” on page 21 for details.

## Using ARP

To configure the Ethernet Interface with its TCP/IP settings using a manual “**arp**” command, the syntax is:

**arp -s *ipaddress ethernetaddress***

For the “**aix**” command, the syntax is:

**aix -s *ether ipaddress Mac_address***

To use either of these commands:

1. Log on to a Unix station as superuser or root. This station must be located on the same subnet as the Ethernet Interface since ARP is limited to subnets.
2. Find the Ethernet address for the Ethernet Interface by printing a configuration or reading it from the operator panel. It must be entered as part of this procedure.

3. Use the "**arp**" command to add an entry into the Unix station ARP table for this Ethernet Interface. Here is the most common syntax for this command:

**arp -s *ipaddress ethernetaddress***

Example for Microsoft TCP stacks:

**arp -s 192.75.11.9 00:80:72:07:00:60**

This example specifies a Ethernet Interface using IP address **192.75.11.9** and Ethernet address **00:80:72:07:00:60**.

4. Verify that the ARP entry was properly applied.

**arp -a**

You should see an entry in the listed ARP table with the IP address and Ethernet address specified in Step 3.

5. Try to "**ping**" this IP address to see if the Ethernet Interface can be seen on your network.

At this point, you should be able to communicate with the Ethernet Interface from your local Unix station. This means the printer knows about an IP address and subnet mask and has these settings in its current memory. However, if the Ethernet Interface is shut off, these settings will be lost unless you store them in flash memory, as follows:

1. Load a Web browser on your Unix station and direct it to the URL "**http://*EthernetInterfaceIPaddress*/networkConf.html**" (e.g. "**http://192.75.11.9/networkConf.html**").

**NOTE:** If prompted for a "User ID" and password first, type in "**root**" for the ID and press ENTER at the password prompt since there is no default password.

2. At the "Network Configuration" HTML form that displays, click in the field below the "IP Address" heading and type in the IP address for the Ethernet Interface.

3. Under the "Subnet Mask" heading, enter the Ethernet Interface subnet mask.

**NOTE:** If you would like to communicate with the Ethernet Interface from across routers, you will need to fill in an entry within the "Routing"

section. Please see “Communicating Across Routers” on page 103 for further details.

4. Click on the SUBMIT button when done and physically repower the print server to make sure the new settings are in effect.

## Using RARP

RARP allows you to dynamically assign an IP address to the Ethernet Interface upon bootup. To configure the Ethernet Interface with its TCP/IP settings using RARP:

1. On your RARP server, make an entry in the /etc/ethers file for the Ethernet Interface.

Syntax:

***ethernetaddress EthernetInterfaceIPaddress***

Example:

**00:80:72:07:00:60 192.75.11.9**

2. Start the RARP daemon on the RARP server if not already running. If it is running, send an HUP signal to it with the “**kill**” command:

Syntax:

**kill -HUP *pid***

where ***pid*** is the process ID of the RARP daemon.

3. Power on the Ethernet Interface so that it immediately sends out an RARP request. Wait one minute to allow the address assignment process to complete. You should see the STAT LED on the Ethernet Interface slow down indicating it knows about an IP address to use.

4. Try to “**ping**” the Ethernet Interface IP address from a local Unix station to see if it can be seen on your network.

**NOTE:** You will only be able to communicate with the Ethernet Interface from a network station on the same subnet as the print server. The Ethernet Interface needs to be told about a default router/ gateway so any packets that come in from a different subnet can be returned via this gateway. Please see “Communicating Across Routers” on page 103 to set this up.

## Using BOOTP

BOOTP allows you to dynamically assign an IP address to the Ethernet Interface upon bootup. In addition, the BOOTP server can provide additional details like a default router/gateway address. To configure the Ethernet Interface with its TCP/IP settings using BOOTP:

1. On your BOOTP server, make an entry in the /etc/bootptab file for the Ethernet Interface.

Syntax:

```
EthernetInterfaceIPname:\
:sm=netmask:\
:hd=homedirectory:\
:bf=null:\
:gw=defaultgateway:\
:ht=ethernet:\
:ha=ethernetaddress:\
:ip=ipaddress:\
:ts=timeserver:\
:to=timezone:
```

Example:

```
spike:\
:sm=255.255.255.0:\
:hd=/usr/null:\
:bf=null:\
:gw=192.75.11.1:\
:ht=ethernet:\
:ha=008072070060:\
:ip=192.75.11.9:\
:ts=192.75.11.7:\
:to=25200:
```

2. Turn the Ethernet Interface on so that it immediately sends out a BOOTP request. Wait one minute to allow the IP address assignment process to complete. You should see the STAT LED, on the Ethernet Interface, slow down indicating it knows about an IP address to use.
3. Try to "**ping**" the Ethernet Interface IP address from a network station to see if it can be seen on your network.

**NOTE:** You will be able to communicate with the Ethernet Interface from network stations on different subnets if the print server has been told about its default router/gateway in the BOOTP response from the BOOTP server.

## Communicating Across Routers

Since Unix environments rely on TCP/IP to communicate with the Ethernet Interface, crossing routers becomes an issue.

After following one of the Ethernet Interface configuration methods mentioned (other than the BOOTP method), you will most likely only be able to communicate with the print server from the same subnet. This means any host across a router will not be able to see your Ethernet Interface. In order to communicate across a router, it is best to store a default router/gateway within the print server so that any packets destined for another subnet get forwarded to this router automatically. The router (or series of routers) can then take over ensuring the packets get to their final destination on another subnet on your network.

To configure a default router/gateway within the Ethernet Interface:

1. Load a Web browser on your Unix station and direct it to the URL "**`http://`*`EthernetInterfaceIPaddress`*`/networkConf.html`**" (e.g. "**`http://192.75.11.9/networkConf.html`**").

**NOTE:** If prompted for a "User ID" and password first, type in "**`root`**" for the ID and press ENTER at the password prompt since there is no default password.

2. At the "Network Configuration" HTML form that displays, click in the first field below the "Gateway" heading and type in the IP address of the default router/gateway for the Ethernet Interface subnet.
3. Click on the SUBMIT button when done and physically repower the print server to make sure the new setting is in effect.

# Unix Host Configuration

There may be times when you would prefer to or have to perform the manual setup steps for a new printer definition. There may also be times when you require a less common print solution such as direct socket capabilities. This section covers these additional setups.

## Manual System V Host Setup

This setup involves any Unix operating system using System V print spooling (e.g. SCO, Solaris, HP-UX**, DG/UX**, etc.). This means an interface file is used for each defined printer and in the case of any System V print setup involving a Ethernet Interface, the RSHD protocol is used to transfer data from the host to the print server.

To manually configure a new System V printer on a Unix station, create a dummy device file that acts as a locking mechanism between contending print jobs.

Syntax:

**`touch /dev/`*`EthernetInterfacename.portname`***

where ***EthernetInterfacename*** is the host or IP name of the print server and ***portname*** is one of its four I/O ports.

Example:

```
touch /dev/spike.prn
```

## Manual LPR/LPD Host Setup

The Ethernet Interface also supports Unix operating systems which follow a BSD print system (e.g. SunOS 4.1.x). This means a printcap file is used to define all printers available on the host and interface scripts are not commonly used. Instead, LPR/LPD printers are defined.

To manually configure an LPR/LPD printer on a BSD Unix system:

1. Define an entry for this new printer within the printcap file, /etc/printcap.

Syntax:

```
printername:
:sh:pw#80:mx#0:\
:rm=EthernetInterfacename:\
:rp=EthernetInterfacedestination:\
:lp=:\
:sd=/usr/spool/lpd/printername:\
:lf=/usr/spool/lpd/printername/log:\
:af=/usr/spool/lpd/printername/acct:
```

where ***printername*** is any name you would like to give to this new printer, ***EthernetInterfacename*** is the host or IP name of the print server, and ***EthernetInterfacedestination*** is one of the pre-defined destinations/queues on the device.

**NOTE:** When the IPDS feature is installed, queue name **d4prn** is not available.

Example:

```
6400:
:sh:pw#80:mx#0:\
:rm=spike:\
:rp=d1prn:\
:lp=:\
:sd=/usr/spool/lpd/ 6400:\
:lf=/usr/spool/lpd/ 6400/log:\
:af=/usr/spool/lpd/ 6400/acct:
```

2. Create the spool directory specified by the "**sd=**" entry in the printcap entry for this printer.

Example:

```
touch /usr/spool/lpd/ 6400
```

3. Create the log and account files specified by the "**lf=**" and "**af=**" entries in the printcap entry for this printer.

Example:

```
touch /usr/spool/lpd/6400/log
touch /usr/spool/lpd/6400/acct
```

4. Change permissions and ownership on the spool directory and everything within it.

Example:

```
chmod -R g+rwX,o+rX /usr/spool/lpd/ 6400
chmod -R daemon.daemon /usr/spool/lpd/ 6400
```

5. Start the printer daemon for this new printer.

Example:

```
lpc start 6400
```

You now have a new printer which relies on LPR/LPD to print to a Ethernet Interface printer. Use the following command to test printing:

Syntax:

**lpr *-printername filename***

Example:

```
lpr -6400 /etc/hosts
```

## Printing from AIX

Version 4.0 and higher of AIX* offers LPR/LPD support for network printing. This means, to set up a new printer under this operating system, you only need to define these two parameters:

1. **Ethernet Interface IP address.** The IP address or host name of the print server you want to print to.
2. **Ethernet Interface destination/queue.** A pre-defined name on the print server telling the device which I/O port to send the jobs to. You will most likely use "**d1prn**" for the PRN.

**NOTE:** When the IPDS feature is installed, queue name **d4prn** is not available.

### Setting Up AIX 4.x

1. Ensure the 6400 AIX driver/colon files are installed on the AIX machine. Syntax:

```
lsdev -P -c printer -F "type subclass description"
| sort -u | grep 6400
```

If “ibm6400” does not appear in the list, the proper driver files are not installed. Obtain the driver files and follow the instructions included with them to install the files on your machine.

2. At the command prompt, enter **`smitty mkvirprt`**.
3. At the “Add a Printer Queue” screen, select “remote”.
4. At “Type of Remote Printing,” select “Local Filtering...”.
5. At “Remote Printing Type,” select “IBM”.
6. At the next “Remote Printing Type,” select “ibm6400”.
7. At “Add a Remote Print Queue with Local Filtering,” perform the following:
   a. Type in any print queue names desired in the entry fields next to the desired emulation(s).

**NOTE:** At least one print queue name field must be filled in.

   b. In the “HOSTNAME” field, type in the hostname or IP address of the printer NIC.
   c. In the “QUEUE” field, type in one of the 4 possible print queue names found on the printer NIC. **d1prn**, **d2prn**, **d3prn**, and **d4prn** are the four default LPD print queues on the NIC. If the defaults have not been changed, choose any one of these queues.

**NOTE:** When the IPDS feature is installed, queue name **d4prn** is not available.

   d. In the “TYPE” field, leave the value as “AIX Version 3 or 4”.
   e. Leave “PASS-THROUGH FLAG” field as “yes”.
   f. Press **Enter** to complete the setup.
   g. After processing has finished, press **F10** to exit SMIT.
8. At the command prompt, enter **`enq -A`** to view the print queues just entered.
9. Enter **`qprt -Pqueuename filename`** to send a job to the printer.

## Printing with FTP

Print jobs can also be sent to the Ethernet Interface using the File Transfer Protocol (FTP). To do this:

1. On your network station, change to the directory containing the file you want to print.
2. Open an FTP session with the Ethernet Interface.

Syntax:

**`ftp`** ***`EthernetInterfaceIPaddress`***

3. Log in as "**`root`**".
4. At the password prompt, press ENTER since there is no default password.
5. Change to the **`dest`** directory.

Syntax:

**`cd dest`**

6. List the contents of this directory using the "**`dir`**" command and determine which destination/queue you would like to send the print job through. Most likely you will select "**`d1prn`**" for the PRN port.

**NOTE:** When the IPDS feature is installed, queue name **d4prn** is not available.

7. Change to this destination directory.

Example:

**`cd d1prn`**

8. Change the mode to correspond with the type of file you are going to print. By default, ASCII is set for text-only files but if you need to print both text and graphics, select binary using the "**`bin`**" command.
9. Place the file to be printed within this directory on the Ethernet Interface so it can be spooled and printed.

Syntax:

**`put`** ***`filename`***

10. Close the FTP session, unless you have more jobs to print.

Syntax:

**`quit`**

## Direct Socket Printing

Within TCP/IP environments, there are some setups which require the host to print directly to a TCP port number on the Ethernet Interface, bypassing all of the higher level destination/queue names. If you run into a setup which requires this, you will need to define two parameters for a new print setup:

1. **Ethernet Interface IP address.** The IP address or host name of the print server you want to print to.
2. **Ethernet Interface TCP port number.** A pre-defined number for the I/O port on the print server. 9100 is the default port number.

Though the host will be sending directly to a TCP port number on the Ethernet Interface, the port numbers are still mapped to destinations/ queues in case there is some type of special processing or logging to be done to the job. However, the destination name is of no concern in this type of printer definition. Only the two parameters mentioned above need to be defined for printing to work.

# Unix Troubleshooting Tips

**NOTE:** During Power Up, the printer performs an interface hardware test. The presence of the Ethernet Interface menu selections at the printer operator panel indicates that the Ethernet Interface hardware is functioning properly. See the *Setup Guide* for configuration menu information.

This section provides information on possible solutions to some standard configuration errors. If you require technical support, please have as much of the following information available when you call:

1. What level of software are you running?
2. What type of attachment do you have?
3. What is your host operating system?

4. Give a detailed description of the problem.
5. How often, and when, does the problem occur?
6. Give a detailed description of your network and the components attached.

Please follow these tips to determine what the problem may be with your Ethernet Interface configuration.

## Ethernet Interface Will Not Talk on the Network

- Have you configured the Ethernet Interface with a unique and valid IP address which corresponds with the other IP addresses on your network? For example, are you sure no other device is using this IP address?
- Are you sure you are trying to talk to the Ethernet Interface from a Unix station on the same subnet? Currently, the print server can only be seen locally unless you configured it with a routing entry.
- If you look at the back of the printer, is the STAT LED flashing once a second or is it quicker than that? A slower, once-a-second rate tells you that the print server is in fact configured with an IP address. A faster rate says it knows nothing about this so you may need to try the configuration process again.

**DANGER:**

| | |
|---|---|
| **<4>** | **Do not connect or disconnect any communication port, teleport, attachment connector, or power cord during an electrical storm.** |
| **<5>** | **Power off the printer and disconnect the power cord before connecting or disconnecting communication port, teleport, or attachment cable connector.** |

- Have you confirmed that the network connection to the Ethernet Interface is working correctly? Trying different network cables and locations will help narrow down the problem.

## Nothing Prints

- Can you "**`ping`**" the Ethernet Interface from your Unix station? If not, please refer to "Ethernet Interface Will Not Talk on the Network," above.
- Is the Ethernet Interface able to communicate with the attached printer? To test this, you can:

  1. "**`telnet`**" to the print server (e.g. "**`telnet 192.75.11.9`**") and log in as "**`root`**".
  2. Enter the command "**`start fox prn`**".
  3. Execute "**`stop prn`**" right after starting the test.

  This test will send the same text line over and over to the attached printer.
- Is the job getting stuck in the Unix host queue? If so, check that the printer is online. If it is, there is a configuration error on the Unix station so creating a new print setup may be needed.
- Is the operator panel showing any activity to indicate it is receiving data? If so, but there is nothing printing, check to see if a manual formfeed is needed. Also, ensure that the printer can support the type of job coming through.
- Do all jobs fail or just certain ones? For example, is it possible that jobs from a certain application are the only ones to fail? If so, check the type of data it sends to make sure it matches the printer emulation. Check the application printer configuration for mistakes.

## Stair-Stepped Output

Stair-stepped output is print which starts at the top left of the page but every line thereafter starts a little further to the right. It also refers to Unix jobs that print one line of text at the top of a page followed by a series of blank pages.

This kind of output happens only with Unix text jobs if carriage return insertion is not incorporated into the print setup. The printer may be told to do a linefeed but the Unix job does not specify anything about a carriage return to follow this.

To fix this, carriage return insertion must be enabled somewhere in the print setup. The easiest and most common location is on the Ethernet Interface itself within the appropriate model. The feature is called “onlcr” and the command syntax is:

**`set model modelname stty onlcr`**

**`save`**

For example, if printing to the destination, **d1prn**, the associated model is **m1**. Therefore, the command is:

```
set model m1 stty onlcr
save
```

**NOTE:** When the IPDS feature is installed, queue name **d4prn** (**m4**) is not available.

## No Form Feed or Extra Page Comes Out

Unix text jobs may also have problems outputting the last page of a job especially when the BSD Remote (LPD) print method is used. This means the form feed button has to be pressed on the printer to get this last page out.

To make this process automatic, tell the Ethernet Interface to handle this task by setting this feature “on” in the appropriate model. The command syntax is:

**`set model modelname trailer $FF`**

**`save`**

For example, if printing to the destination, **d2prn**, the associated model is **m2**. Therefore, the command is:

```
set model m2 trailer $FF
```

**`save`**

**NOTE:** When the IPDS feature is installed, queue name **d4prn** (**m4**) is not available.

For default destination model mappings of the Ethernet Interface, please see “Ethernet Interface Naming Schemes” on page 183.

## TCP/IP Access Problem

If you can “**`ping`**” the printer from a workstation, but you cannot Web browse, Telnet, or print to the printer through the Ethernet Interface, there may be an incorrect entry in the TCP access list. In order for this workstation to use the Ethernet Interface in this case, one of two things must happen.

1. The TCP list must have an entry added to grant access to this workstation.
2. All entries must be deleted from the TCP list to grant all workstations/ hosts access to the above TCP services.

To view the current access list:

Use the printer operator panel to access the configuration menu (see the *Setup Guide* for configuration menu information). From the DIAGNOSTICS/Printer Tests menu choose the Ethernet Test Page. When the page prints, look under the “TCP ACCESS TABLE” section for the TCP access list entries.

To add/delete a TCP access list entry, refer to “TCP Access Lists” on page 179.

**NOTE:** When the following procedure is used, the TCP access list will be cleared but all IP addresses will need to be entered again after the procedure is complete.

To reset all TCP/IP values to the factory defaults when access is impossible:

1. Obtain a printer configuration printout using the operator panel. See the *Setup Guide* for configuration menu information.
2. Power off the printer.
3. On the Ethernet Interface, place SWITCH 2, the center switch, in the down position.
4. Power on the printer and wait for the READY state.

5. On the Ethernet Interface, place SWITCH 2, the center switch, in the up position.
6. From a workstation attached to this network segment, create an ARP entry. The Ethernet Interface IP address and hardware or MAC address are needed. At the workstation enter:

```
arp -s <ipaddress> <MACaddress>
ping <ipaddress>
```

7. Try to "**ping**" this IP address to see if the Ethernet Interface can be seen on your network. If the interface does not respond, verify you are on the same network segment as the printer and that the ARP entry was created.
8. Telnet into the Ethernet Interface using the same IP address as above. Log in as root with no password.
9. At the system prompt, enter:

```
store tcpip from default
config http on
reset
```

**NOTE:** This will reset all TCP/IP settings to factory default and reset the Ethernet Interface.

10. Wait five minutes for the Ethernet Interface to reset.
11. Power the printer off and then back on.
12. Wait for the "ETHERNET ADAPTER IS READY" message to display.
13. Set the IP address, subnet mask, and default gateway parameters to the desired values. (see "Configuration Tools" on page 21).

## Web Browser/HTTP Problem

In some cases you may not be able to browse the printer web page simply because the Ethernet Interface HTTP may be turned off.

If you cannot "**ping**" the Ethernet Interface IP address, make sure the IP Address, subnet mask, and default gateway are set correctly by checking the Ethernet Parameters menu from the operator panel. See the *Setup Guide* for configuration menu information.

If you can "**ping**" the Ethernet Interface IP address but can not access the web pages, perform the following procedure to verify the Ethernet Interface HTTP is turned on.

1. Telnet into the Ethernet Interface and log in as root with no password.
2. At the system prompt enter the following commands:

```
config http on
save
reset
```

3. After approximately 5 minutes, point your browser to the Ethernet Interface IP address. The printer web pages should now be accessible.

If you are still experiencing difficulty accessing or browsing the printer, contact technical support for further assistance.

## AIX Print Queue Times Out

If the AIX print queue is timing out when sending print jobs, edit the `qconfig` file in the `/etc` directory by adding a **`-T5`** to the backend definition for the 6400 print queue.

# Chapter 7 Unix Troubleshooting Tips

# 8 *Novell Configuration*

## Overview

This chapter details a complete Novell setup including:

1. Identifying the Ethernet Interface on the network.
2. Configuring the Ethernet Interface with its mandatory print setup settings.
3. Configuring a new print queue on the file server.

## Novell Environment Description

The Ethernet Interface supports network printing under Novell environments by using IPX. It supports all 3.1X versions of NetWare. Figure 17 provides a Novell setup overview. Version 4.1X is supported under bindery emulation only.

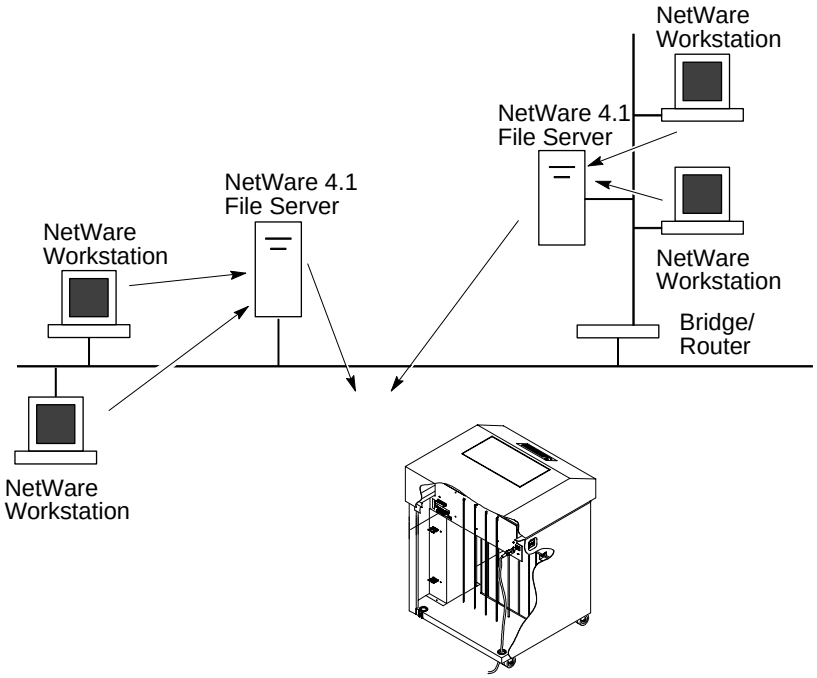



**Figure 17. Novell Integration**

# Novell Ethernet Interface Configuration

Under all Novell environments, the Ethernet Interface does not require any network settings to make it visible on the network. Simply plug it in to your network and power it on. However, with a new print queue setup on a Novell file server, there can be some mandatory settings needed on the Ethernet Interface.

## Using HTML Forms

When defining a new print queue on a Novell file server, a new print server must be defined to represent the Ethernet Interface. This name must match the pre-defined name given to the print server. By default, this name is in the format "M_*xxxxxx*" where "*xxxxxx*" equals the last six digits of the Ethernet address found on a configuration printout or control panel settings under Ethernet parameters, MAC Address (e.g. M_071C1A).

To use the HTML forms to define a print queue, do the following:

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP. The command to change the print server name is:

Syntax:

**`store pserver name`** ***`newname`***

Example to change the name to **`micro1`**:

**`store pserver name micro1`**

2. Direct your Web browser to URL "**`http://`*`EthernetInterfaceIPaddress`*`/adminConf.html`**" (e.g. "**`http://192.75.11.9/adminConf.html`**").

**NOTE:** If prompted for a "User ID" and password first, type in "**`root`**" for the ID and press ENTER at the password prompt since there is no password by default.

3. At the "Administration Configuration" HTML form that displays, highlight the field beside the "Name" heading and type in the new name of the print server.

4. Click on the SUBMIT button when done and physically repower the printer to make the new setting take effect.

# Novell Host Configuration

Under all versions of NetWare**, both PSERVER and RPRINTER setups are supported by the Ethernet Interface. Since a PSERVER setup is the most common, you will find the necessary steps to configure the Ethernet Interface as a PSERVER shown first. Configuration for RPRINTER and NPRINTER setup follow the PSERVER information.

**NOTE:** The Ethernet Interface can service up to four printers on one file server. It can not service multiple file servers at one time.

## NetWare Version 3.x PSERVER Setup

To configure a print queue on a NetWare 3.1x network:

1. Log on to the Novell file server as supervisor.
2. Enter PCONSOLE.
3. Select “Print Queue Information” from the PCONSOLE Main Menu.
4. Press INSERT to add a new queue to the list of currently defined queues showing.
5. Type in the name of this new queue when prompted and press ENTER. This can be any name you would like.
6. Press ESCAPE to return to the Main Menu.
7. Select “Print Server Information” and press ENTER.
8. Press INSERT when the list of existing print servers displays.
9. Type the name of the Ethernet Interface when prompted for a print server name and press ENTER when done. By default, the Ethernet Interface is named “M_*xxxxxx*” where “*xxxxxx*” equals the last six digits of the print server Ethernet address found on configuration printouts or reading MAC address on control panel. (e.g. M_071C1A).
10. Back at the print server list, select this newly defined Ethernet Interface and press ENTER.
11. Select “Print Server Configuration” from the menu that displays.
12. Select “Printer Configuration” from the next menu to display a list of configured printers.

13. Select the first item listed as “NOT INSTALLED” and press ENTER.
14. At the printer configuration window, type in the name for this new printer. This name must be one of the pre-defined destinations/ queues on the Ethernet Interface. This will normally be “**d1prn**”.

**NOTE:** When the IPDS feature is installed, queue name **d4prn** is not available.

15. Go to the “Type” field and press ENTER to see the possible choices.
16. Select “Defined Elsewhere” from this list.
17. When done, press ESCAPE and select “Yes” to save the changes to this new printer.
18. Press ESCAPE again to return to the “Print Server Configuration” menu.
19. Select “Queues Serviced by Printer.”
20. Select this new printer from the printer list that displays and press ENTER.
21. At the empty queue list that displays, press INSERT.
22. Select the queue created in step 5 and press ENTER.
23. When prompted for the priority, press ENTER to select the default or select a priority.
24. Press ESCAPE until back at the PCONSOLE Main Menu.
25. Repower the printer.
26. Wait two minutes and then select “Print Queue Information” from the PCONSOLE Main Menu.
27. Select this new queue from the menu that displays. Select “Currently Attached Servers” to see which print server is servicing this queue.

At this point, the Ethernet Interface name (e.g. M_071C1A) should show within this window. This means the Ethernet Interface knows about this new Novell print queue it must service as a PSERVER. Therefore, it will poll this queue regularly looking for jobs to print.

**NOTE:** The Ethernet Interface can service up to four printers on one file server. It can not service multiple file servers at one time.

## NetWare Version 3.x RPRINTER Setup

These steps are for Novell environments with Netware 3.x (or earlier) file servers.

To configure a new RPRINTER on a NetWare 3.x network:

1. Log in to the Ethernet Interface command shell, npsh, as root.

   If you have TCP/IP available and this print server already has an IP address stored within it, you can use the built-in HTML configuration forms or a Telnet session. Please see “Configuration Tools” on page 21 for further details. If you have only Novell available, you will need to use a PC, laptop, or terminal.

**NOTE:** If you use HTML configuration, you will need to go to the “Network Configuration” HTML form (i.e. “**`http://EthernetInterfaceIPaddress/networkConf.html`**”; e.g. “**`http://192.75.11.9/networkConf.html`**”) and look under the “Novell” section. The settings in the following step are found there. If using a Telnet session, you will need to manually execute the commands listed in the next step.

2. Store the RPRINTER settings on the Ethernet Interface. This will refer to an existing PSERVER.NLM on the file server or to one that you will create later in these steps.

Syntax:

**`store rprinter add PSERVERname printernumber EthernetInterfacedestination`**

Example for an RPRINTER servicing printer **0** of the PSERVER.NLM called **`pserver1`** and sending jobs to the Ethernet Interface destination **`d1prn`**:

**`store rprinter add pserver1 0 d1prn`**

**NOTE:** When the IPDS feature is installed, queue name **‘d4prn’** is not available.

3. Leave this Ethernet Interface login session and log on to the NetWare 3.x file server as Supervisor.

4. Load a PSERVER.NLM if there is not one loaded already. This will be the PSERVER that the Ethernet Interface services as an RPRINTER so it must match the PSERVER name given in step 2.
5. Enter PCONSOLE.
6. Select “Print Queue Information” from the PCONSOLE Main Menu.
7. Press INSERT to add a new queue to the list of currently defined queues.
8. Type in the name of this new queue when prompted and press ENTER. This can be any name you would like.
9. Press ESCAPE to return to the Main Menu.
10. Select “Print Server Information” and press ENTER.
11. Press INSERT when the list of existing print servers displays.
12. Select the print server that you want the Ethernet Interface to service as an RPRINTER. This is the PSERVER.NLM loaded in step 4.
13. Select “Print Server Configuration” from the menu that displays.
14. Select “Printer Configuration” from the next menu to display a list of configured printers.
15. Select an item from the list (i.e. either an existing printer name or a “Not Installed” one) to display the printer configuration window.
16. Assign a name (if not an existing printer) to this printer.
17. At the “Type” field, select “Remote Other/Unknown.”
18. Press ESCAPE to save the changes.
19. Press ESCAPE until back at the “Print Server Configuration” menu.
20. Select “Queues Serviced by Printer” to display a list of defined printers.
21. Select the printer you just defined and press ENTER.
22. At the list of queues that displays, press INSERT to add a queue to the list.
23. Select the queue defined and press ENTER.
24. When prompted for a priority, press ENTER to select the default or select a priority.

25. Press ESCAPE until you have exited PCONSOLE.
26. Reload the PSERVER.NLM that the Ethernet Interface is to service as an RPRINTER.
27. Repower the Ethernet Interface by turning the printer off and then back on.
28. Wait two minutes and then check your PSERVER to see if the appropriate printer is being serviced. The PSERVER should indicate that the printer is “Waiting for job.”

At this point, the Ethernet Interface knows to receive any jobs this PSERVER.NLM has to send to it through the defined printer.

## NetWare Version 4.x PSERVER Setup

Ethernet Interface destinations are case sensitive and will not be recognized if they are typed incorrectly. By default, they are all lower case. If you are setting up a NetWare 4 environment, the destination must be renamed to uppercase to match the PCONSOLE entry.

The Ethernet Interface can be used in a NetWare 4 environment with either of the following options:

- Set the Ethernet Interface up as a PSERVER, replacing a dedicated printer.
- Set the Ethernet Interface up as an RPRINTER, interacting with an existing PSERVER (see page 127).

**NOTE:** Following a PSERVER setup, bindery emulation is required.

To configure the Ethernet Interface as a PSERVER in a NetWare 4 environment:

1. Log in to the Novell as supervisor.
2. Enter PCONSOLE.
3. Press F4.
4. Select PRINT QUEUES.
5. Press INSERT to add a queue.
6. Type in new queue name and press ENTER.

7. Press ESCAPE.
8. Select PRINT SERVERS.
9. Press INSERT to add the new print server.
10. Type the name of the Ethernet Interface. By default, it is M_*xxxxxx* where *xxxxxx* equals the last six digits of the Ethernet address. (e.g. M_000BF5)
11. Select this new print server and press ENTER.
12. Select PRINTERS.
13. Press INSERT to add a printer to the list.
14. Type in the name of one of the default destinations on the unit for the NAME field and press ENTER. Press ENTER on this new printer and go to the “Printer Type” field.

**NOTE:** When the IPDS feature is installed, queue name **‘d4prn’** is not available.

15. Press ENTER at this field and select DEFINED ELSEWHERE. If DEFINED ELSEWHERE is not available, choose OTHER/ UNKNOWN.
16. Press ENTER on the Print Queues Assigned field.
17. Press INSERT to display all queues; select the one you defined in step 5 and press ENTER.
18. Select a priority and press ENTER. Priority 1 should be sufficient.
19. Press ESCAPE, saving changes, until you are back to the Main Menu.
20. Reboot the Print Server by repowering the printer.
21. Go to the print queue created above, and check the Attached Print Servers screen to verify the print server is active in servicing this queue.
22. Press ESCAPE until you are out of the PCONSOLE.

Even though the entire print set up is done through PCONSOLE, you may want to communicate directly with the print server in order to modify settings, monitor the unit, etc. To communicate with the print server, the optional host software, **npsh.exe**, is available. **npsh.exe** is a DOS

executable program that can be run from a DOS prompt on a NetWare workstation.

**npsh.exe** performs the following:

**`npsh nvplist`**
Lists all of the Ethernet Interface devices on the network; each name is in the default format M_*xxxxxx* (where *xxxxxx* equals the last six digits of the unit Ethernet address). This is regardless of whether it is configured as a PSERVER or an RPRINTER.

**`npsh`** ***`unitname`***
Starts a Telnet-like session with the named print server, allowing you to configure, monitor, and troubleshoot the unit with the built-in command set.

**`npsh`** ***`unitname command`***
Initiates a single Command with guest access only to the unit instead of entering into a complete session.

To communicate with the unit using **`npsh.exe`**:

1. From a DOS prompt on a Novell workstation, begin an npsh session with the unit.

**`npsh`** ***`unitname`***

   Starts a Telnet-like session with the named print server with guest access only.

2. To obtain root access to the unit, type:

**`supervisor`**

   A standard login screen is displayed prompting you for the login name and password.

3. Login to the unit as root user.

**`root`**

**NOTE:** Root users require the use of a password as configured in the unit user list.

4. Enter the password. If this password is not yet set, press enter at the password prompt. Otherwise, enter the password that is already stored in the unit.

***`password`***

You are now logged in to the unit as a root user and can access any npsh command on the unit.

**NOTE:** Because **`npsh.exe`** makes use of broadcasts, you may have problems communicating across a router.

## NetWare Version 4.x RPRINTER Setup

These steps are for Novell environments using NetWare 4.x (or later) file servers. To configure a new RPRINTER in a NetWare 4.x network:

1. Specify the Print Server information:

**Option 1:** If you have TCP/IP available, and this printer NIC already has an IP address stored within it, you can use the built-in HTML configuration forms. Please see “Configuration Tools” on page 21 for further details on setting up TCP/IP on the printer.

If you use this HTML configuration, go to the "Network Configuration" HTML form:

**`http://`*`EthernetInterfaceIPaddress`*`/networkConf.html`**
(e.g.: **`http://192.75.11.9/networkConf.html`**)

and look under the "Novell" section to setup the necessary parameters in the RPRINTER section:

Check the boxes to enable the following parameters in the Ethernet interface:

- For **Print Server Name**, enter the name of the PSERVER.NLM which will service this printer (e.g.: **PServer1**).
- For **Printer Number**, enter the printer number in the previous PSERVER that will reference this printer (e.g.: **0**).
- For **Destination**, choose one of the logical print queues in the list (e.g: **d1prn**).

**NOTE:** When the IPDS feature is installed, queue name **‘d4prn’** is not available.

- **Submit** the form and reboot the NIC.

**Option 2:** If you have TCP/IP available, and this printer NIC already has an IP address stored within it, you can use Telnet to execute the

necessary configuration commands. Please see “Configuration Tools” on page 21 for further details on setting up TCP/IP on the printer.

Telnet into the printer NIC, login as root, and execute these commands:

**`store rprinter add PServerName printernumber destination`**

e.g.: for an RPRINTER servicing printer **0** of the PSERVER.NLM called **PServer1** and sending jobs to the Ethernet Interface destination **d1prn**:

**`store rprinter add PServer1 0 d1prn`**

**NOTE:** When the IPDS feature is installed, queue name **‘d4prn’** is not available.

Reset the NIC:

**`reset`**

**Option 3:** If you only have Novell protocol available, use the **npsh** utility.

**npsh** into the printer NIC, login as root, and execute these commands:

**`store rprinter add PServerName printernumber destination`**

e.g.: for an RPRINTER servicing printer **0** of the PSERVER.NLM called **PServer1** and sending jobs to the Ethernet Interface destination **d1prn**:

**`store rprinter add PServer1 0 d1prn`**

**NOTE:** When the IPDS feature is installed, queue name **‘d4prn’** is not available.

Reset the NIC:

**`reset`**

2. Login to the NetWare tree as a user with sufficient rights to create/manipulate the necessary printing objects (PSERVER, Printer, Print Queue). Change to the NDS context in which you want to create/manipulate these printing objects.
3. Enter PCONSOLE. If necessary, change to the NDS context in which you want to create/manipulate these printing objects.
4. From "Available Options" menu, select "Print Queues".
5. In "Print Queues" menu, press INSERT to add a new queue to the list of queues. Type in any desired name of this queue, press ENTER, then specify its queue volume when prompted.

6. Press ESC to return to the "Available Options" menu.
7. Select "Printers".
8. In "Printers" menu, press INSERT to add a new printer to the list of printers. Type in any name desired, e.g. **6400p**, then press ENTER.
9. Select this newly created printer to bring up the "Printer *printername* Configuration" menu.
10. Select "Printer type:", and then select "Other/Unknown".
11. Select "Print queues assigned:", then press INSERT. From the "Object, Class" menu, select the previously created print queue to be associated with this printer.
12. Press ESC, saving changes if asked to, until you return to the "Available Options" menu.
13. Select "Print Servers" to bring up the "Print Servers" menu.
14. Either select the existing print server name as specified in step 1 above, or press INSERT to create this print server and enter the print server name as specified in step 1 above then select this new print server. e.g.: **PServer1**.
15. In the "Print Server Information" menu, select "Printers".
16. In the "Serviced Printers" menu, press INSERT, then select the printer name as specified in step 8 above, e.g.: **6400p**. In the "Printers" menu, select this printer.
17. In the "Printer *printername* Configuration" menu, set the "Printer number:" to match the printer number specified in step 1 above.
18. Press ESC until you return to "Available Options" menu.
19. Load the PSERVER.NLM specified in step 1 above on the file server which will host this PSERVER, and specify the name of this PSERVER, e.g.: **`load pserver PServer1`**
20. You may need to power off/on the printer to allow the Ethernet interface to attach to the PSERVER. Wait about 2 minutes, then check the PSERVER.NLM screen on the file server to see if the appropriate printer (e.g.: **6400p**) is being serviced. The printer should be in "Waiting for job" state.

21. Send a job to the print queue specified in the steps above to see if printing will occur.

# Novell Troubleshooting Tips

**NOTE:** During Power Up, the printer performs an interface hardware test. The presence of the Ethernet Interface menu selections at the printer operator panel indicates that the Ethernet Interface hardware is functioning properly. See the *Setup Guide* for configuration menu information.

This section provides information on possible solutions to some standard configuration errors. If you require technical support, please have as much of the following information available when you call:

1. What level of software are you running?
2. What type of attachment do you have?
3. What is your host operating system?
4. Give a detailed description of the problem.
5. How often, and when, does the problem occur?
6. Give a detailed description of your network and the components attached.

Please follow these tips to determine what the problem may be with your Ethernet Interface configuration.

## NetWare 3.x - No PSERVER Connection

- Has the Ethernet Interface been power cycled once the PCONSOLE steps were completed? This will make the print server boot up and realize which print queue and file server it needs to service.
- Is the Ethernet Interface already servicing a queue on another file server? If so, it can not service another file server at the same time.
- When defining a new "**`print server`**" within PCONSOLE, did you use the correct name for the Ethernet Interface (e.g. M_071C1A)? By default, it only recognizes itself as "M_*xxxxxx*" where "*xxxxxx*" equals the last six digits of its Ethernet address on the configuration printout.

- When defining a new "**`printer name`**" within PCONSOLE, did you use a pre-defined destination/queue from the Ethernet Interface rather than a name of your own? By default, the Ethernet Interface only recognizes names like "**`d1prn`**." All other names will be ignored by the device.

**NOTE:** When the IPDS feature is installed, queue name **d4prn** is not available.

- The Ethernet Interface only supports Bindery mode when acting as a PSERVER. Make sure all PCONSOLE setup is performed in Bindery mode.
- Is there an available NetWare user license for the Ethernet Interface to use while it acts as a PSERVER? Every PSERVER takes up one user license since it logs in to the Novell file server.
- Have you given the connection process some time after repowering the Ethernet Interface? In larger Novell environments, the file server identification and connection process can take several minutes.

## NetWare 4.x - No PSERVER Connection

- Has the Ethernet Interface been power cycled once the PCONSOLE steps were completed? This will make the print server boot up and realize which print queue and file server it needs to service.
- Is the Ethernet Interface already servicing a queue on another file server? If so, it can not service another file server at the same time.
- When defining a new "**`print server`**" within PCONSOLE, did you use the correct name for the Ethernet Interface (e.g. M_071C1A)? By default, it only recognizes itself as "M_*xxxxxx*" where "*xxxxxx*" equals the last six digits of its Ethernet address found on the configuration printout.
- When defining a new "**`printer name`**" within PCONSOLE, did you use a pre-defined destination/queue rather than a name of your own? By default, the Ethernet Interface only recognizes names like "**`d1prn`**." All other names will be ignored by the device.

**NOTE:** When the IPDS feature is installed, queue name **d4prn** is not available.

- The Ethernet Interface only supports Bindery mode when acting as a PSERVER. Make sure all PCONSOLE setup is performed in Bindery mode.
- Is there an available NetWare user license for the Ethernet Interface to use while it acts as a PSERVER? Every PSERVER takes up one user license since it logs in to the Novell file server.
- Have you given the connection process some time after repowering the Ethernet Interface? In larger Novell environments, the file server identification and connection process can take several minutes.

# 9 *InfoPrint Manager Configuration*

## InfoPrint Manager

The IBM 6400 printer requires InfoPrint Manager Version 2.1.1 with PTF UR50783 installed, or Version 3.1.0 with PTF U462820 installed.

To configure InfoPrint Manager to print using your IBM 6400 printer:

1. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See “Configuration Tools” on page 21.
2. Define the printer to InfoPrint Manager as described in the “Defining Printers to InfoPrint Manager” section on page 134.

## Defining Printers to InfoPrint Manager

To configure a printer with the IPDS feature as a PSF TCP/IP-attached physical printer:

1. In the InfoPrint GUI, open a physical printers well or a window with a physical printers pane.
2. Select the **Physical Printer Template Type** icon from the Types column of the Templates area. If you do not see a template for PSF TCP/IP-attached physical printers, select the **Preferences** button at the bottom of the window to change the template types that the GUI displays.
3. Drag and drop a PSF TCP/IP-attached physical printer template into the physical printers well or pane. This step displays the **Add Physical Printer** dialog.
4. In the **Model** field, enter a model name (e.g. **IBM6400**).
5. Fill in the other fields as you prefer. For information about these fields, see the GUI online help or the **pd_att_phy_ptr** man page.
6. Select the **OK** button.
   InfoPrint closes the dialog and displays an icon representing the new physical printer in the physical printers well or pane. No further configuration is necessary; but if you wish, you can modify the attributes of the new physical printer in the same way as any other physical printer.
7. If you plan to create similar physical printers for other network printers, you can create a template by dragging the new physical printer to the template area.

# 10 *MVS Configuration for an IPDS Printer*

## Overview

Use this chapter to configure MVS to print IPDS files on your IBM 6400 network printer.

To print IPDS files, you must have the IPDS option on the printer.

### Requirements

Verify that you have the following required software:

- PSF/MVS Version 2.2.0 with APAR OW15599 (for TCP/IP support)
- MVS Scheduler with APAR OW12236 to support two new PRINTDEV keywords: IPADDR and PORTNO
- TCP/IP Version 3 Release 1, or higher, installed and configured on MVS

To obtain the PTFs associated with these APARs, contact the IBM Support Center.

### Configuration Checklist

All of the following configuration steps carried out on MVS require appropriate RACF authority.

1. Using the printer operator panel, set up the printer for IPDS by setting the parameters and values shown in Table 6.

**Table 6. Operator Panel Settings**

| Menu | Item | Setting |
|---|---|---|
| PRINTER CONTROL | Interface Selection | • AUTO SWITCH if you use the printer for other than IPDS printing<br>• ETHERNET for IPDS only |
| IPDS | IPDS Emulation Mode | 6408/6412 |

2. Set TCP/IP addresses for the printer, such as IP address, gateway address, or subnet mask. See “Configuration Tools” on page 21.
3. Configure the host environment. See “Configuring PSF for MVS to Print IPDS Files”, below.
4. Verify the configuration. See “Verifying a TCP/IP-Attached Printer on MVS” on page 144.
5. If you want to share the printer, do the procedure in “Sharing IBM 6400 Printers on MVS” on page 145.
6. If you have problems, refer to “Handling MVS Connectivity Problems” on page 147.

# Configuring PSF for MVS to Print IPDS Files

To perform this procedure, you need the IP address of the NIC.

## Configuration Procedure

Configuring PSF/MVS to print IPDS files includes the following steps:

1. Define the MVS communications control unit to MVS. See “Define the Communications Control Unit to MVS” on page 137.
2. Modify the TCP/IP profile on your MVS system, if necessary. See “Modify the TCP/IP Profile in MVS” on page 137.
3. “**`Ping`**” the printer. See “Verify the Printer Connection” on page 140.

4. Define the printer as a writer-controlled printer to JES. See “Define the Printer to JES” on page 140.
5. Define the printer to PSF/MVS with a PRINTDEV statement, including the IP address. See “Define the Printer to PSF/MVS” on page 141.

This section does not provide all the information you need to install and configure TCP/IP on your MVS system. For more information on installing TCP/IP, refer to *TCP/IP for MVS: Customization and Administration Guide*.

The routing of information is determined on the basis of the IP address, and is performed by IP gateways. After the network is configured correctly, the MVS host appears to be communicating directly with the TCP/IP-attached printer.

## Define the Communications Control Unit to MVS

If you have not already done so, define the communications control unit for the MVS host, such as the 3172 or the 3745 control unit, to MVS. Use either an MVS configuration program (MVSCP) or a hardware configuration definition (HCD), depending on the version of your MVS system:

- When using a version earlier than MVS 4.1.0, use an MVSCP.
- When using a version of MVS 4.1.0 or later, use an HCD or an MVSCP.

For more information about using these methods, refer to:

- *MVS/ESA* Migration Planning: Dynamic I/O Configuration*
- *MVS/ESA Hardware Configuration: Using the Dialog*

## Modify the TCP/IP Profile in MVS

The TCP/IP profile contains system configuration statements used to initialize the TCP/IP address space. Of those statements, the following are subject to special considerations when you are printing from PSF/MVS on TCP/IP-attached printers. Samples of these statements are printed in bold in the example shown in Figure 18.

```
ACBPOOLSIZE                          1000
ADDRESSTRANSLATIONPOOLSIZE           1500
CCBPOOLSIZE                          150
DATABUFFERPOOLSIZE                   160    32768
ENVELOPEPOOLSIZE                     750
IPROUTEPOOLSIZE                      300
LARGEENVELOPEPOOLSIZE                50
RCBPOOLSIZE                          50
SCBPOOLSIZE                          256
SKCBPOOLSIZE                         256
SMALLDATABUFFERPOOLSIZE              256
TCBPOOLSIZE                          512
TINYDATABUFFERPOOLSIZE               256
UCBPOOLSIZE                          100
KEEPALIVEOPTIONS INTERVAL 10 SENDGARBAGE FALSE ENDKEEPALIVEOPTIONS
GATEWAY
;   *  Network      First hop     Linkname   Packet Size   Subnet mask   Subnet value
    9               =             BPCLAN     2000          0.255.255.0   0.99.12.0
    DEFAULTNET      9.99.12.254   BPCLAN     2000          0.255.255.0   0
```

**Figure 18. Modifying TCP/IP Profile**

This section contains information about the statements, the special considerations that apply to them, and the changes they may make necessary. If you change any of the values in the TCP/IP profile, restart TCP/IP to pick up the changes.

For information about the TCP/IP profile and the statements described in this section, refer to:

- *IBM TCP/IP MVS Customization and Administration Guide*
- *IBM TCP/IP Performance and Tuning Guide*

### DATABUFFERPOOLSIZE

The DATABUFFERPOOLSIZE statement defines the number and size of the data buffers. For printing on TCP/IP-attached printers, IBM recommends that you specify at least **160** data buffers, **32768** buffer size.

### SMALLDATABUFFERPOOLSIZE

The SMALLDATABUFFERPOOLSIZE statement defines the number of small data buffers. For printing on TCP/IP-attached printers, IBM recommends that you specify at least 256 small data buffers.

### TINYDATABUFFERPOOLSIZE

The TINYDATABUFFERPOOLSIZE statement defines the number of tiny data buffers. For printing on TCP/IP-attached printers, IBM recommends that you specify at least 256 tiny data buffers.

### KEEPALIVEOPTIONS

PSF relies on TCP to detect when a connection with a TCP/IP-attached printer is no longer usable. When no data has been exchanged between PSF/MVS and its connection partner, TCP sends keep-alive probes to the connection partner periodically. These periodic probes, called keep-alive transmissions, enable TCP to discover when a connection is no longer usable even if the connection partner is abruptly powered off or is no longer accessible through the network.

The frequency of keep-alive transmissions is controlled by the INTERVAL parameter on the KEEPALIVEOPTIONS statement. The frequency applies to all TCP applications that direct TCP to send keep-alive transmissions. The default frequency is after about two hours of inactivity.

For printing on TCP/IP-attached printers, IBM recommends that you specify a shorter interval than the default, such as 10 minutes, for the interval between keep-alive transmissions.

Also, if any target host requires that the keep-alive packet contain data, specify SENDGARBAGE TRUE. For example:

```
KEEPALIVEOPTIONS INTERVAL 5 SENDGARBAGE TRUE ENDKEEPALIVEOPTIONS
```

### GATEWAY

The **Packet Size** parameter of the GATEWAY statement defines the maximum transmission unit (MTU) for the MVS host. For IBM 6400 printers, the MTU size is fixed at 1024 bytes. The value cannot be adjusted.

## Verify the Printer Connection

To verify that the MVS system can establish a connection with the TCP/IP-attached printer, "**ping**" the printer from the MVS system.

From a TSO session, enter the following command:

**TSO PING *ip_address***

In JES2, enter the following command from the System Display and Search Facility (SDSF) menu 6:

**ping *ip_address***

***ip_address*** specifies the IP address of the NIC.

Here is an example of a successful "**ping**" command:

```
EZA0458I Ping V3R1: Pinging host 9.99.12.33
(Use ATTN to interrupt.)
EZA0463I PING: Ping #1 response took 0.084 seconds.
Successes so far = 1.
```

Here is an example of an unsuccessful "**ping**" command:

```
EZA0458I Ping V3R1: Pinging host 9.99.12.33
(Use ATTN to interrupt.)
EZA0464I PING: Ping #1 timed out
```

**NOTE:** If you have problems "**ping**"-ing a printer, refer to "Handling MVS Connectivity Problems" on page 147.

## Define the Printer to JES

When a TCP/IP-attached printer is to be used with JES, it must be defined for deferred printing mode with JES.

### JES2 Printer Definitions

Below an example of the JES2 printer definition initialization member, located in the system PARMLIB:

```
FSS(FSS1),PROC=PSFPROC,HASPFSSM=HASPFSSM
PRT1     FSS=FSS1,MODE=FSS,PRMODE=(LINE,PAGE,SOSI1),
            CLASS=C,UCS=0,SEP,NOSEPDS,CKPTPAGE=100,
            DRAIN,MARK,TRKCELL=YES
```

The above example is correct for JES2 3.11 and above. For earlier versions of JES2, the statement is named **FSSDEF** and would be stated as **FSSDEF FSSNAME=FSS1**.

The value you specify for the PROC parameter must match the name on the PSF/MVS Startup procedure.

#### JES3 Printer Definitions

Below is an example JES3 printer definition. This example is not executable, but it is intended to help the JES3 systems programmer define the printer to the MVS host.

```
FSSDEF,TYPE=WTR,FSSNAME=FSS1,PNAME=PSFPROC,SYSTEM=SYS1,TERM=NO
DEVICE,JNAME=PRT1,JUNIT=(,SYS1,,OFF),FSSNAME=FSS1,
         MODE=FSS,PM=(LINE,PAGE,SOSI1),CHARS=(YES,GT12),
```

The value you specify for the JNAME parameter must match the name of the printer in the PSF/MVS Startup procedure.

The value you specify for the PNAME parameter must match the name on the PSF/MVS Startup procedure.

## Define the Printer to PSF/MVS

Each TCP/IP-attached printer must be defined to PSF with a PRINTDEV statement in the PSF/MVS startup procedure.

Figure 19 shows a sample PSFPROC procedure that you can modify to suit your installation. The PRINTDEV statement shows the required IPADDR keyword.

No 6400 printer-specific writer procedure is currently supplied by IBM. You can, however, copy the APSWPROT sample from the APAR medium and modify it for the IBM 6400 printer.

**NOTE:** The IBM 6400 printer supports only resident symbol sets.

```
//PSFPROC PROC
//*************** IBM NETWORK PRINTERS WRITER PROCEDURE ***************
//*
//*01* MODULE-NAME = PSFPROC
//*
//*01* DESCRIPTIVE-NAME = START PROCEDURE FOR PSF:
//*                       TCP/IP ATTACHED IBM NETWORK PRINTERS
//*
//*01* NOTES = THE FULL NAME OF THE DEFAULT PAGEDEF IS
//*                       P1A06462.
//*                  THE FULL NAME OF THE DEFAULT FORMDEF IS
//*                       F1A10110.
//*                  THE FULL NAMES OF THE DEFAULT FONTS ARE
//*                       X0GF10, X0GS10, X0TU10, AND X0GU10.
//*                  THE FULL NAME OF THE SEPARATOR PAGE PAGEDEF IS
//*                       P1V06483.
//*                  THE FULL NAME OF THE SEPARATOR PAGE FONT IS
//*                       X0GT15.
//*
//*
//*01* CHANGE-ACTIVITY:
//*
//**** END OF SPECIFICATIONS ***/
//STEP01    EXEC PGM=APSPPIEP,REGION=4096K
//JOBHDR OUTPUT PAGEDEF=V06483,      /* JOB SEPARATOR PAGEDEF          */
//         FORMDEF=A10110,CHARS=GT15 /* JOB SEPARATOR FORMDEF          */
//JOBLTR OUTPUT PAGEDEF=V06483,      /* JOB SEPARATOR PAGEDEF          */
//         FORMDEF=A10110,CHARS=GT15 /* JOB SEPARATOR FORMDEF          */
//DSHDR OUTPUT PAGEDEF=V06483,       /* DS SEPARATOR PAGEDEF           */
//         FORMDEF=A10110,CHARS=GT15 /* DS SEPARATOR FORMDEF           */
//MSGDS OUTPUT PAGEDEF=A06462,       /* MESSAGE DATASET PAGEDEF        */
//         FORMDEF=A10110            /* MESSAGE DATASET FORMDEF        */
//FONT300   DD    DSN=SYS1.FONT300,  /* SYSTEM FONTS - 300 PEL         */
//             DISP=SHR
//PSEG01    DD    DSN=SYS1.PSEGLIB,  /* SYSTEM PAGE SEGMENTS           */
//             DISP=SHR
//OLAY01    DD    DSN=SYS1.OVERLIB,  /* SYSTEM MEDIUM OVERLAYS         */
//             DISP=SHR              /*
//PDEF01    DD    DSN=SYS1.PDEFLIB,  /* SYSTEM PAGEDEFS                */
//             DISP=SHR
//FDEF01    DD    DSN=SYS1.FDEFLIB,  /* SYSTEM FORMDEFS                */
//             DISP=SHR
//* ************************************************************************************ */
//*                  PRINTDEV
```

**Figure 19. Sample PSFPROC procedure**

```
//* ************************************************************************************ */
//PRT1    CNTL
//PRT1    PRINTDEV FONTDD=*.FONT300,   /* 300 PEL FONT LIBRARY DD          */
//        OVLYDD=*.OLAY01,             /* OVERLAY LIBRARY DD               */
//        PSEGDD=*.PSEG01,             /* SEGMENT LIBRARY DD               */
//        PDEFDD=*.PDEF01,             /* PAGEDEF LIBRARY DD               */
//        FDEFDD=*.FDEF01,             /* FORMDEF LIBRARY DD               */
//        JOBHDR=*.JOBHDR,             /* JOB HEADER SEPARATOR             */
//*                                    /*      OUTPUT                      */
//        JOBTRLR=*.JOBTLR,            /* JOB TRAILER SEPARATOR            */
//*                                    /*      OUTPUT                      */
//        DSHDR=*.DSHDR,               /* DATA SET HEADER                  */
//*                                    /*      SEPARATOR                   */
//        MESSAGE=*.MSGDS,             /* MESSAGE DATA SET OUTPUT          */
//        BUFNO=5,                     /* NUMBER OF WRITE DATA BUFFERS     */
//        PAGEDEF=A06462,              /* DEVICE PAGEDEF DEFAULT           */
//        FORMDEF=A10110,              /* DEVICE FORMDEF DEFAULT           */
//        CHARS=(GF10,                 /* DEVICE                           */
//        GS10,TU10,GU10),             /* DEFAULT FONT SET                 */
//        PIMSG=YES,                   /* ACCUMULATE DATA SET              */
//*                                    /*      MESSAGES                    */
//        DATACK=BLOCK,                /* REPORT ALL DATA-CHECK            */
//*                                    /*      ERRORS                      */
//        TRACE=NO,                    /* CREATE INTERNAL TRACE            */
//        FAILURE=WCONNECT,            /* PSF ACTION ON PRINTER            */
//*                                    /*      FAILURE                     */
//        TIMEOUT=REDRIVE              /* PSF ACTION ON TIMEOUT            */
//        MGMTMODE=OUTAVAIL,           /* PRINTER MANAGEMENT MODE          */
//        DISCINTV=15,                 /* DISCONNECT INTERVAL IN           */
//*                                    /*      SECONDS                     */
//        IPADDR='xxx.xxx.xxx.xxx'     /* IP ADDRESS FOR TCP/IP            */
//PRT1    ENDCNTL
```

**Figure 19. Sample PSFPROC procedure (continued)**

**NOTE:** To specify a TCP/IP address space name other than the default, TCPIP, code the following exec statement in the writer procedure:

```
//STEP01      EXEC PGM=ASPPIEP,REGION=4096K, PARM=(,,,,tcpip_name)
```

where *tcpip_name* is the name of the TCP/IP address space. If this parameter is not coded, PSF/MVS uses the default name, TCPIP.

The IP address is the only required parameter. Other parameters may be set to facilitate printer sharing as described in “Sharing IBM 6400 Printers on MVS” on page 145. For a description of the PRINTDEV statement, which is not given here, see the PSF/MVS *System Programming Guide*.

**IPADDR**

Specifies the IP address for the printer or attachment, in dotted-decimal notation. Do not specify a hostname in place of the dotted-decimal address.

## Verifying a TCP/IP-Attached Printer on MVS

To operate a TCP/IP-attached printer, use JES operator commands.

### Starting a TCP/IP-attached Printer

To start a TCP/IP-attached printer, do the following:

1. Start TCP/IP.
2. Power on the printer.
3. Start the printer FSA.
   - On **JES2**, the command is:
     **$S*printer_name***
   - On **JES3**, the command is:
     ***VARY *printer_name*,ON**

### Stopping a TCP/IP-attached Printer

You can stop a TCP/IP-attached printer in several ways:

- The preferred method is to first stop the PSF FSA for the printer by entering the following command from the MVS console:

  **JES2:**
  **$P*printer_name***

  **JES3:**
  ***VARY *printer_name*,OFF**
  ***CANCEL *printer_name***

where *printer_name* specifies the name of the printer FSA.

Then you can turn off power to the printer.

- To end the PSF FSA for the printer, use the JES commands. If you are unable to purge or cancel the printer by use of the JES commands, enter the following command:
  **MODIFY *FSSname*,FORCE,*printer_name***

### Resolving IPDS Printing Problems

If you have problems printing, do the following:

- Print an Ethernet Test Page. Refer to your *Setup Guide*.
- Verify that the IPDS service is enabled.
- Verify the service name.
- Verify that port number 5001 is being used.

If you are still unable to print IPDS files, contact IBM support.

## Sharing IBM 6400 Printers on MVS

IBM 6400 printers can be shared on PSF/MVS in one of two ways:

- By using the MGMTMODE and DISCINTV parameters via the JES spool.
- By port switching on the printer.

### JES Spool Printer Sharing

JES spool printer sharing is valid for TCP/IP attached network printers. A session with the printer is maintained while there is output on the JES spool and the printer is available. When there is no more output on the spool and the disconnect interval expires, PSF/MVS ends the session with the printer. PSF/MVS attempts to restart the session when there is more work on the spool for the printer. After the session is restarted, PSF/MVS must reload the resources required for the print jobs. When using this method of network printer sharing, PSF/MVS cannot determine if another print driver is active.

You can request this method of network printer sharing by specifying the following parameters in the PSF Startup Proc.

```
MGMTMODE=OUTAVAIL
FAILURE=WCONNECT
TIMEOUT=REDRIVE
DISCINTV=n
```

**MGMTMODE**

Set to OUTAVAIL. OUTAVAIL requests that PSF start a communications session with the printer only when output is available on the JES spool.

**FAILURE**

Specifies the action PSF/MVS is to take after a printer failure or a TCP/IP network failure. If FAILURE=WCONNECT and the printer is connected to another host when PSF/MVS attempts to establish a connection on TCP/IP, PSF/MVS continuously retries (up to the limit specified by CONNINTV) until the printer becomes available. FAILURE=STOP stops the attempt to connect to the printer.

**TIMEOUT**

Specifies the action that PSF/MVS is to take after a timeout when no output is available on JES. The DISCINTV parameter specifies the timeout interval. TIMEOUT=REDRIVE requests that PSF/MVS redrive the printer FSA using the value of the MGMTMODE parameter. TIMEOUT=STOP requests that PSF/MVS stop the printer FSA, which can then be restarted only by an operator command.

**DISCINTV**

Specifies the disconnect interval in seconds. The value can range from zero through 86400. IBM suggests you set the value to 15. When no output is available from JES for this time period, PSF/MVS ends the session with the network printer. If the value is set to zero, PSF/MVS does not end the session because of lack of output.

**NOTE:** PSF/MVS supports two other methods of printer sharing, which are not applicable to IBM 6400 printers. VTAM RELREQ is available for printer sharing under SNA. Port switching is available for SNA- and TCP/IP-attached printers when a printer can support multiple active ports.

## Port Switching Printer Sharing

To support printer sharing, IBM 6400 printers automatically switch among all attached ports (serial port, the twinax or coax port, or the Ethernet network port). Basically, the printer prints jobs for one port until no new jobs appear and the port “times out”. The printer then switches to the next port and does the same thing.

To change the default “time out” value for a port, update the TIMEOUT value for the port on the appropriate menu (Serial Interface, Ethernet, Twinax Interface, or Coax Interface).

# Handling MVS Connectivity Problems

If you encounter problems when “**`ping`**”-ing a network printer from MVS, here is how to resolve them.

## Ping is Not Successful

If the “**`ping`**” is not successful, verify the following:

- The printer is powered on.
- The IP address is unique in the TCP/IP network.
  If the IP address of the MVS system is not unique, see your network administrator to resolve the IP address problem.
- The Maximum Transmission Unit (MTU) size of the IP packet for the MVS system is equal to the MTU size of the printer. For information about the values recommended for the MVS system, see “Modify the TCP/IP Profile in MVS” on page 137.

  To change the MTU size for the MVS system, change the GATEWAY statement in the MVS TCP/IP profile, and restart TCP/IP to pick up the changes.

You cannot change the MTU size on an IBM 6400 printer. The MTU size is fixed at 1024 bytes.

If these items are all in order, consult your TCP/IP network administrator about a possible network problem.

## Ping is Successful

A successful "**ping**" usually indicates that the MVS system can communicate with the printer; however, you might receive a successful "**ping**" even though the IP address of the TCP/IP-attached printer is a duplicate of another IP address.

If PSF is unable to establish a network connection with the TCP/IP-attached printer or if PSF output for this printer prints elsewhere, follow these steps to determine whether the IP address of the printer is unique:

1. Turn the printer off.
2. Wait at least 5 minutes for TCP/IP to clear the Address Resolution Protocol (ARP) tables. (If your installation specified a longer interval on the ARPAGE configuration statement in the TCP/IP profile, you may need to wait longer. For information about the ARPAGE statement, refer to the *IBM TCP/IP MVS Customization and Administration Guide*.)
3. Enter the "**ping**" command again from the MVS system.

**NOTE:** If you receive a successful response to the "**ping**" command, there is a duplicate IP address. Consult your TCP/IP network administrator.

# 11 *Monitoring IBM 6400 Printers*

## The IBM 6400 Printer Management Model

This chapter describes the IBM printer management model and several different tools which can be used to monitor network printers.

**NOTE:** See the NPM online help for information about monitoring using NPM.

Use this chapter if you want to install a network management system and need to understand IBM's use of network printer management capabilities with the SNMP agent on the NIC.

### Implementing Printer Management

Printer management includes the following tasks:

- Monitoring the status of network printers
- Responding to alarms
- Gathering statistics on printer operations

The three elements of network printer monitoring and management are:

- Agent/manager model
- MIB, the management information database
- SNMP, the protocol used to get management information

## Agent/Manager Model

The elements of a monitoring system, MIB and SNMP, are implemented in an agent/manager model:

- The **manager** is a console, workstation, or server on working hubs or routers which has a global knowledge of NICs and printers.
- **Agents** are utilities that reside on devices, such as a NIC, that respond through SNMP to management requests for information. The information is stored in a MIB (Management Information Base).

## MIB

A MIB is a management information base that contains information a device makes available to SNMP. The MIB describes information about actual objects to be managed and controlled. There are many different MIBs defined.

### Standards of IBM Network Printer MIBs

The Printer MIB is based on the following standards:

- System and Interfaces Group MIB (RFC 1213 of March 1991)
- Host Resource MIB (RFC 1514 of September 1993)
- Printer MIB (RFC 1759 of March 1995)

### Components of the Printer MIB

The IBM Printer MIB gives the network manager access to most of the information that is normally accessible through the NIC command set for configuring the server with SNMP. Some objects identified by this MIB are not applicable to the NIC.

The complete definition of the Printer MIB is provided in the Printer MIBs in DOS Format and Printer MIBs in TAR Format, which are shipped with the NIC. The MIB is provided in a subset of the ASN.1 syntax. The Printer MIB is composed of the following sections:

- General
- Cover

- Localization
- Input
- Output
- Marker
- Media Path
- Channel
- Interpreter
- Console
- Alert

## Information Provided by the MIB

The Printer MIB contains the following types of information about IBM network printers:

**Descriptions.** Printer configuration, location, and contact.

**Status.** Current operating status of printers.

**Alerts.** Reportable events from printers.

## General Information about MIBs

For further information on SNMP and MIB, refer to the following:

- RFC 1155 — Structure and Identification of Management Information for TCP/IP-based Internets (SMI)
- RFC 1156 — Management Information Base for Management of TCP/IP Internets (MIB)
- RFC 1157 — A Simple Network Management Protocol (SNMP)
- The Simple Book: An Introduction to Management of TCP/IP-based Internets

### Getting the Latest MIB Information

To obtain the latest copy of these and other RFCs, FTP the files from one of the following two sources:

Internet:
**ftp.isi.edu\internet-drafts**

World Wide Web:
**http://www.ietf.cnri.reston.va.us/lid-abstracts.html**

## SNMP

SNMP is the protocol used to communicate between manager and agent. Managers request information, usually through automated polling at specified intervals, and agents respond. Though used primarily on TCP/IP networks, SNMP can be implemented on other protocols, for example, IPX.

SNMP is a standard by which a network manager can get statistics and configuration information from the NICs and other devices on the network. This is done through a Network Management Station (NMS), such as IBM NetView.

# Monitoring Tools

Many tools can be used to monitor printers with SNMP agents. One of these tools is IBM NetView*. There are also other MIB browsers, which are not described here.

## OS/2 TCP/IP

To get SNMP.EXE to work correctly to browse MIB items, you may need to delete the following file:

**d:\mptn\etc\mib2.tbl**

## Monitoring with AIX NetView/6000

The IBM AIX NetView/6000 program can manage any IP-addressable device with an SNMP agent.

NetView/6000 can be used to set a network topology, monitor a network, diagnose problems, and measure network performance.

Through its MIB Browser, information about the resources affecting an event (such as an alarm) can be obtained.

## Setting the SNMP Community Name

The default SNMP read-only community name is “public”, and cannot be changed.

Change the SNMP R/W community name with the command:
**`set user passwd snmp`** ***`com_name`***
**`save`**
where ***`com_name`*** is the new SNMP R/W community name.

The default is no R/W community name.

**NOTE:** Changing SNMP community names or access rights may hinder or disable applications that are monitoring your printers, such as the IBM Network Printer Manager and the IBM TCP/IP Network Port Monitor.

# Chapter 11 Monitoring Tools

# 12 *IBM Network Printer Manager*

IBM Network Printer Manager (NPM) lets network administrators monitor, control, and configure IBM 6400 printers in various environments. NPM works with the IBM 6400, the network printer family, including IBM Infoprint 20 and 32 (except for NPM for OS/2), and IBM Network Printers 12, 17, and 24. For the Windows and IP and Web versions, you can also use NPM with other manufacturer's network printers that comply with RFC 1759, such as the Hewlett-Packard** LaserJet** 5si and the Lexmark** Optra** N.

**NOTE:** IBM 6400 is supported only in the "web" version, not NT or OS/2.

Using NPM, administrators can:

- View the status of each printer, such as its alarm conditions
- View and change printer properties, such as the default input tray
- View and change printer network properties, such as the NetBIOS printer network workgroup name
- Add new network services to printers so you can customize the environment, such as creating high- and low-priority print services

For detailed information on how to use NPM, please refer to NPM online help.

You can configure NPM for the World Wide Web using either the TCP/IP or NetBIOS network protocols, and use TCP/IP to monitor the printers.

## Chapter 12

NPM is available on the World Wide Web. To obtain the latest version of NPM:

1. Access the IBM Printing Systems Home Page at:
   **`http://www.printers.ibm.com`**
2. Navigate to IBM Network Printer Manager.
3. Follow the instructions to download NPM. Installation instructions are in the README file.

# 13 *Commands*

## Command Shell Overview

The Ethernet Interface comes with an in-depth command shell called "**npsh**." It allows you to manipulate objects like destinations, I/O ports, and models and provides monitoring and troubleshooting capabilities.

### npsh Access Methods

There are many ways this command shell can be accessed:

- built in HTML forms
- a Telnet session from a TCP/IP host to the Ethernet Interface
- a single remote shell command (i.e. rsh, rcmd, remsh) from a TCP/IP host

### Main npsh Command Prefixes

All configurable commands either start with "**`store`**" or "**`set`**", troubleshooting commands usually start with "**`debug`**", and view commands start with "**`list`**".

**NOTE:** If the "**`store`**" prefix is used, the Ethernet Interface must be repowered to make the changes take effect. Since "**`store`**" affects flash memory settings only, the print server must reset and read the new settings now in flash memory.

**NOTE:** If the "**`set`**" prefix is used, a "**`save`**" command must be executed as well so that the new settings are retained after power cycles. Since "**`set`**" only affects the settings in memory, they will be lost after a power cycle unless they are saved to flash memory.

## Getting Command Help

The Ethernet Interface command shell provides several online help tools. These include:

### "?" Command

Typing "**?**" when logged in to the command shell will produce a full listing of all commands available.

### Command Prefixes

Typing in the first portion of a command will produce an error message showing the correct syntax. For example, typing in "**`store tcpip`**" will produce a list of all commands that start with this prefix.

# Complete Command List

This section outlines the entire Ethernet Interface command set including the command syntax, a description, and in most cases, an example for each command listed.

**NOTE:** If you see the word "***ifnum***" in any npsh commands, you should substitute a "**1**" unless told otherwise. This "**1**" represents the one network interface (i.e. Ethernet) supported.

## store Commands

These commands change the settings stored in flash memory and do not affect the current or working settings in memory. A power cycle is needed before the stored settings become current.

**store ifc *ifnum* utp [-]li [-]rx**
**store ifc 1 utp li**

Modify the physical UTP interface properties where **li** enables link integrity and **rx** enables the increased receive threshold.

**store ifc from default**

Set all UTP settings back to factory defaults.

**store ifc from current**

Store all current UTP settings to flash memory so they are retained after a power cycle. This ensures all current settings match what is stored in flash memory.

**store pserver opts [[-]jobsecurity] [jobtimeout *seconds*]**
**store pserver opts jobsecurity jobtimeout 5**

If **jobsecurity** is disabled, any user can cancel queued jobs on the Ethernet Interface including guest users. If **jobtimeout** is set to some value other than 0, the Ethernet Interface will only wait this amount of ***seconds*** when getting printer feedback. This is only used if you have a logpath port and type set on a particular destination.

**store pserver tcpsocket *TCPportnumber* port *newTCPportnumber***

**store pserver tcpsocket 4000 port 5000**

Change a pre-defined ***TCPportnumber*** on the Ethernet Interface to a ***newTCPportnumber***. The default number is 9100 for prn.

**store pserver tcpsocket *TCPportnumber* dest *destination***

**store pserver tcpsocket 5000 dest d1prn**

Assign a pre-defined ***TCPportnumber*** to a particular ***destination*** on the Ethernet Interface. Therefore, if you are using a print method that sends jobs directly to a TCP port number, you still have the option to process the job data through this destination setting.

**store pserver novell passwd *password***

**store pserver novell passwd mplex**

Store the ***password*** for the Ethernet Interface to use when logging in to a Novell file server. This ***password*** would have to match one set on the file server.

**store pserver novell user name *username***

**store pserver novell user name micro1**

Define a ***username*** on the Ethernet Interface to be used when it logs into a Novell file server to find information. This ***username*** must match a user pre-defined on the Novell file server.

**store pserver novell user passwd *password***

**store pserver novell user passwd mplex2**

Define a ***password*** on the Ethernet Interface for the Novell user already defined. This ***password*** must match the one stored on the Novell file server. Passwords are optional as long as there is not one defined on the file server for the user.

**store pserver novell fserver add|del *fileservername***

**store pserver novell fserver add fs1**

Add or remove a server entry on the Ethernet Interface for the Novell file server it will be servicing.

**store pserver smb workgrp *newworkgroupname***
**store pserver smb workgrp eng**

Define a different Windows workgroup as defined by ***newworkgroupname*** for the Ethernet Interface to be visible within. By default, the print server only comes up within the group called "WORKGROUP."

**store pserver from default**

Set all general print server settings back to factory defaults.

**store pserver from current**

Store all current general print server settings to flash memory so they are retained after a power cycle. This ensures all current settings match what is stored in flash memory.

**store rprinter add|del *printservername printernumber destination***
**store rprinter add pserver1 0 d1prn**

Add or delete the RPRINTER settings on the Ethernet Interface for a Novell environment. The ***printservername*** must be the name of an existing PSERVER.NLM on your Novell file server. The ***printernumber*** is the printer number within this PSERVER.NLM. The ***destination*** is the queue on the Ethernet Interface where the print jobs will be sent to.

**store tcpip *ifnum* addr *IPaddress***
**store tcpip 1 addr 192.75.11.9**

Store the IP address for the Ethernet Interface.

**store tcpip *ifnum* mask *netmask***
**store tcpip 1 mask 255.255.255.0**

Store the subnet mask for the Ethernet Interface.

**store tcpip *ifnum* opts [[-]rarp] [[-]bootp]**
**store tcpip 1 opts -rarp -bootp**

Enable or disable the automatic RARP and BOOTP requests for IP addresses upon bootup. If you are storing the Ethernet Interface TCP/IP network settings within the device, you will not need to rely on RARP or BOOTP for new settings.

**store tcpip *ifnum* frametype [[-]ethernet2] [[-]802.2snap]**

**store tcpip 1 frametype ethernet2 802.2snap**

Control which frame type(s) is supported with the TCP/IP protocol. By default, both **Ethernet 2** and **802.2snap** are enabled but normal TCP/IP communications rely on Ethernet 2. This setting has no affect on other supported network protocols (e.g. Novell).

**store tcpip route add|del host|net *IPaddress ifnum***

**store tcpip route add net 192.75.12.0 1**

**store tcpip route del net 192.75.12.9 1**

Add or delete a static route to a particular TCP/IP host or subnet specified by ***IPaddress*** so the Ethernet Interface knows how to communicate with it. Normally one entry for a default router/gateway is all that is needed for communications between different subnets. Please see the next command for details.

**store tcpip route add|del default *routerIPaddress ifnum***

**store tcpip route add default 192.75.11.1 1**

Store a default router/gateway defined by ***routerIPaddress*** so the Ethernet Interface knows where to direct packets destined for another subnet. It is easier to store one default entry rather than an entry per remote host or network as in the previous command.

**store tcpip tcp rxwin *packets***

**store tcpip tcp rxwin 2**

Determine the receive window size for the Ethernet Interface. Usually the ***packets*** value ranges from 2 to 8 with the lower number allowing for more simultaneous TCP connections with the print server.

**store tcpip tcp opts [-]keepalive [-]disbufmgmt**
**store tcpip tcp opts keepalive -disbufmgmt**

Control whether the Ethernet Interface maintains a connection with a host when data can not be accepted into its buffer. Normally the **keepalive** feature is enabled so when the printer can not accept data, the print job connection is maintained and continued once the situation clears. If **disbufmgmt** is disabled (i.e. "-"), the Ethernet Interface will not buffer any data when there is a blocked situation with the printer. Normally it is best to have both **keepalive** and **disbufmgmt** enabled.

**store tcpip tcp access [root] add|del *IPaddress***
**store tcpip tcp access add 192.75.11.25**

Add or remove an entry from the Ethernet Interface TCP access list defined by ***IPaddress***. If the list has an entry, only this host can print to and remotely interact with the print server.

**store tcpip proxy add|del *targetIPaddress***
**store tcpip from default**

Set all TCP/IP network settings back to factory defaults.

**store tcpip from current**

Store all current TCP/IP network settings to flash memory so they are retained after a power cycle. This ensures all current settings match what is stored in flash memory.

## set Commands

These settings alter the current or working settings in memory only. Therefore, they will be lost if the Ethernet Interface is power cycled. To ensure this does not happen, be sure to issue a "**save**" command so the current settings get written to flash memory.

**set date *year month day***
**set date 1997 02 10**

Set the current date noting the four-digit **year**, the two-digit **month** from 1 through 12, and the **day** being the number in the month. If the Ethernet Interface is reset, this value will be lost so you will need to set the date again.

**set dest *destination* name *newname***
**set dest d1prn name laser**

Change the current name of the ***destination*** to a new name as indicated by ***newname***. This ***newname*** must be nine characters or less or it will be truncated. These names are case sensitive.

**set dest *destination* backchannel prn**
**set dest d1prn backchannel prn**

Establish a return path for printer feedback for a given ***destination***. Since the Ethernet Interface I/O port is bi-directional, however, you will most likely use the same I/O port that the ***destination*** is currently sending jobs to.

**set dest *destination* model *modelname***
**set dest d1prn model m4**

Associate a model with a destination. Jobs sent to the named ***destination*** are processed according to the options defined in the named model.

**set dest *destination* logpath *logpathname***
**set dest d1prn logpath l4**

Associate a logpath with a destination. Jobs sent to the named ***destination*** are logged according to the settings defined in the named logpath.

**set dest *destination* service [[-]socket][[-]lpd] [[-]lpsched] [[-]rprinter] [[-]pserver] [[-]netbios] [[-]ftpd]**
**set dest d1prn service -netbios**

Set the ***destination*** to handle only certain print services. To add a service, specify the service name. To disable a service, use "**-**" before the name. The available services are:

| | |
|---|---|
| **socket** | Direct socket printing via TCP/IP. |
| **lpd** | LPR printing with TCP/IP including LPR clients on any platform. |
| **lpsched** | LP or System V printing with TCP/IP. |
| **rprinter** | Novell RPRINTER support. |
| **pserver** | Novell PSERVER support. |

| | |
|---|---|
| **netbios** | Windows 95 and Windows for Workgroups printing. |
| **ftpd** | Printing using the File Transfer Protocol (FTP) via TCP/IP. |

**`set dest from default`**

Set all destination settings back to factory defaults.

**`set dest from stored`**

Set all current destination settings to the values stored in flash memory.

**`set logpath` *`logpath`* `name` *`newname`***
**`set logpath l1 name pagecount`**

Change the current name of the ***logpath*** to a new name as indicated by ***newname***. This ***newname*** must be nine characters or less or it will be truncated. These names are case sensitive.

**`set logpath` *`logpath`* `type [[-]job] [[-]user] [[-]pgcnt] [[-]cksum] [[-]printer] [[-]ioport]`**
**`set logpath l2 type job user printer pgcnt`**

Establish the type of printer and print job logging to be done within this **logpath**. The options are:

| | |
|---|---|
| **job** | Job ID, username, etc. |
| **user** | User ID along with three messages per job about start and finish. |
| **pgcnt** | For total pages printed in a job. |
| **cksum** | 16-bit checksum value to confirm integrity of data printed. |
| **printer** | For special printer feedback. |
| **ioport** | Printer error messages determined through the parallel port pins. |

**`set logpath` *`logpath`* `port` *`TCPportnumber`*`| email|syslog`**
**`set logpath l3 port 2000`**

Determines where the log information should be sent for a print job or attached printer. The choices are:

***TCPportnumber***TCP port number ranging from 1024 to 65000.

**email** Particular user's email address. This address is set using the "**set sysinfo email *emailname@IPaddress***" command.

**syslog** A central TCP/IP host running the SYSLOG daemon. This host is set using the "**set sysinfo syslog *IPaddress***" command.

**`set logpath from default`**

Set all logpath settings back to factory defaults.

**`set logpath from stored`**

Set all current logpath settings to the values stored in flash memory.

**`set model *model* name *newname*`**
**`set model m1 name landscape`**

Change the current name of the ***model*** to a new name as indicated by ***newname***. This ***newname*** must be nine characters or less or it will be truncated. These names are case sensitive.

**`set model *model* type raw`**
**`set model m2 type raw`**

Set the model **type** to **raw** so that it does not process the data passing through it in any way.

**`set model *model* banner [ps|text|auto [after]]`**
**`set model m2 banner text`**

Determine whether a banner page should be added for print jobs passing through the ***model*** mapped destination/queue. **auto** will determine which type is needed depending on the type of print job data passing through. By default, banner pages are added to the front of the job. If **after** is set, the banner page will come at the end.

**`set model *model* stty [[-]onlcr] [[-]descramble] [xtab *tablength*|none]`**
**`set model m3 stty onlcr`**

Control extra job processing done by the ***model***. The processing options are:

**onlcr** Carriage return insertion for Unix text jobs. Adds carriage returns to text jobs with solitary linefeeds. This will prevent stair-stepped output or output running off the right side of the page.

| | |
|---|---|
| **descramble** | Automatic descrambling of print jobs passing through which have been scrambled using Printronix proprietary scramble Unix utility, **npscramble**. |
| **xtab** | Tab expansion from 1 to 16 spaces. |

**set model *model* trailer *trailerstring***
**set model m7 trailer $FF**

Set a trailer string to be sent to the printer at the end of any print jobs passing through this ***model***. ***trailerstring*** can consist of up to nine elements. An example element is a hexadecimal code (e.g. 0x04) or a pre-defined variable on the print server (e.g. $FF for a formfeed). Use "***list var***" to see all available variables.

**set model from default**

Set all model settings back to factory defaults.

**set model from stored**

Set all current model settings to the values stored in flash memory.

**set prn [-]autofd**
**set prn -autofd**

Assert or do not assert the AUTOFD line for carriage return insertion. This only affects printers that support this function such as impact printers.

**set prn flush**
**set prn flush**

Flush the data in the parallel port input and output buffers.

**set prn unlock**
**set prn unlock**

Release the access lock on the parallel port.

**set prn timeout *minutes* |none**
**set prn timeout none**

Terminate the print job sent to the parallel port if it is not printed after the timeout period in ***minutes*** expires. The ***minutes*** value ranges from 0 though 255 with 0 indicating no timing out to take place. This is the default setting and should be fine for most print setups.

**set prn [-]opost**
**set prn -opost**

Allow or disallow output processing on the parallel port such as carriage return insertion (i.e. onlcr).

**set prn [-]onlcr**
**set prn -onlcr**

Enable or disable carriage return insertion on the parallel port. This may be needed for Unix text jobs coming through with solitary linefeeds. This feature is almost always set at the model level rather than the I/O port level though.

**set prn xtab *tablength* |none**
**set prn xtab none**

Set the tabstop width as indicated by ***tablength***. The range is 1 through 16 spaces.

**set prn from default**

Set all parallel port settings back to factory defaults.

**set prn from stored**

Set all current parallel port settings to the values stored in flash memory.

**set sysinfo name *newname***
**set sysinfo name salesprinter**

Set a descriptive name defined by ***newname*** for Ethernet Interface identification purposes. This is not used in the operation of the print server in any way.

**set sysinfo location *description***
**set sysinfo location salesdept**

Set the physical location of the Ethernet Interface. This is for identification purposes and is not used in the operation of the print server in any way.

**set sysinfo contact *contactname***
**set sysinfo contact Paul_Harris**

Set a person or department to contact in case of print server trouble.

**`set sysinfo loginfo [-]sys | [-]tcp | [-]ipx | [-]spx`**
**`set sysinfo loginfo -sys ipx`**

Set the Ethernet Interface debugging information type. Usually this information includes unexpected errors or exceptions from the print server divided into these groups:

| | |
|---|---|
| **sys** | General system messages. |
| **tcp** | TCP stack messages. |
| **ipx** | IPX stack messages. |
| **spx** | SPX stack messages. |

**NOTE:** This is not printer or job logging information.

**`set sysinfo logport null|syslog`**
**`set sysinfo logport null`**

Define where the debugging information should be sent to. This can be sent to an output device off of the Ethernet Interface I/O port or to a central TCP/IP host running a SYSLOG daemon. To set this host, use the command "**`set sysinfo syslog`** ***`hostIPaddress`***".

**`set sysinfo email`** ***`emailname@IPaddress`***
**`set sysinfo email joe@192.75.11.5`**

Define the user email address to receive printer and job logging information from a particular logpath on the Ethernet Interface. ***emailname*** is the host or IP name of the user and ***IPaddress*** is the IP address where the mail is stored on your network.

**`set sysinfo syslog`** ***`hostIPaddress`***
**`set sysinfo syslog 192.75.11.30`**

Set the IP address of the host running the SYSLOG daemon. Ethernet Interface debugging or print job and printer logging information can be sent to that IP address.

**`set sysinfo dns`** ***`DNSserverIPaddress`***
**`set sysinfo dns 192.75.11.2`**

Set your DNS server IP address so the Ethernet Interface can resolve host names when used with its built-in Telnet and Ping clients.

**set sysinfo descramblekey *hexvalue***
**set sysinfo descramblekey 1234**

Set the key value used for descrambling print jobs that have passed through Printronix **npscramble** utility on a TCP/IP host. This key is a four-digit hexadecimal value obtained from the host software, npscramble. Within the npscramble source code, there is a variable called SR_KEY which contains the default key value. This can be changed to any four-digit value you would like.

**set sysinfo module [[-]novell] [[-]netbios]**
**set sysinfo module -novell**

Enable and disable certain network protocol stacks within the Ethernet Interface. Sometimes it helps to disable any protocols you are not using on your network.

**set time *hours* [*minutes* [*seconds* ]]**
**set time 10 30**

Set the current time noting the ***hours*** based on the 24-hour system and the ***minutes*** and ***seconds*** ranging from 0 through 59. If the Ethernet Interface is reset, this value will be lost so you will need to set the time again.

**set user add|del *username***
**set user add eng**

Add or remove a user on the Ethernet Interface defined by ***username***.

**IMPORTANT** **Be careful not to delete the root user, or you will be unable to configure any further settings on the print server. You will have to go back to factory defaults to correct this problem.**

**set user passwd *username password***
**set user passwd eng mplex1**

Assign a ***password*** to a defined user on the Ethernet Interface. This ***password*** must be less than eleven characters.

**set user type *username* root|guest**
**set user type eng root**

Assign root or guest privileges to a particular user defined by ***username***. Guest permissions allow viewing of settings only. Root permissions allow complete control of the Ethernet Interface.

**`set user from default`**

Set all user settings back to factory defaults.

**`set user from stored`**

Set all current user settings to the values stored in flash memory.

**`set user passwd snmp com_name`**

Sets the new SNMP R/W community name as the ***`com_name`*** value.

**`set var variablename variablestring`**
**`set var LANDSCAPE 0x1b 0x26 0x6c 0x31 0x4f`**
**`set var FINISH $FF $PCL-RST`**

Define a new variable to be used in header, trailer, or switch strings on the Ethernet Interface and call it ***variablename***. ***variablestring*** can be a space-separated list of words, hexadecimal numbers (e.g. 0x04), or references to other pre-defined variables. It is easiest to make up the ***variablestring*** with hexadecimal values as shown in the example.

**NOTE:** One variable counts as one element within header and trailer strings.

**NOTE:** Defined variables are referenced in strings by placing a "**`$`**" before the variable name (e.g. "**`set model m1 trailer $FF`**").

**`set var from default`**

Set all variable settings back to factory defaults.

**`set var from stored`**

Set all current variable settings to the values stored in flash memory.

## list Commands

These commands list the current or working settings for a particular section within the command shell. To view stored settings in flash memory, you will need to add in "**`stored`**" within the beginning of any of the following commands. For example, "**`list prn`**" shows you the current prn settings but "**`list stored prn`**" shows you the settings sitting in flash memory. Normally these should match.

**`list tcpip`**

List all current TCP/IP network settings (e.g. IP address and subnet mask).

**`list pserver`**

List the current general print server settings (e.g. print server name and Novell mode).

**`list dest`**

List the current destination settings (e.g. names and mapped I/O ports, models, and logpaths).

**`list model`**

List the current model settings (e.g. names and mapped destinations).

**`list logpath`**

List the current logpath settings (e.g. names and mapped destinations).

**`list prn`**

List the current parallel port setting (e.g. mode).

**`list sysinfo`**

List the current Ethernet Interface system information (e.g. contact name and protocol stacks enabled).

**`list ifc`**

List the current UTP interface settings (e.g. link integrity).

**`list user`**

List the current user definitions (e.g. user names and types).

**`list logins`**

List any active user logins on the Ethernet Interface.

**`list arp`**

List the current ARP table that the Ethernet Interface adheres to in a TCP/IP network.

**`list var`**

List all pre-defined variables including any newly created ones. Any of these defined variables can be referenced in a string by placing a "**$**" before the variable name (e.g. "**`set model m1 trailer $FF`**").

**`list rprinter`**
List any current RPRINTER definitions.

**`list time`**
List the current time on the Ethernet Interface.

**`list date`**
List the current date on the Ethernet Interface.

**`list test`**
List the status of output tests on the I/O ports.

**`list key`**
List the license details and license key number.

**`list diff`**
List the differences between the current settings and the stored settings in flash memory. Normally, you want these values to match so issue a "**`save`**" command followed by a "**`reset`**".

## debug Commands

The "**`debug`**" set of commands help troubleshoot problems that may occur on the Ethernet Interface. Some of the output may be cryptic but it helps when troubleshooting.

**`debug tcp`**
List TCP stack statistics.

**`debug ip`**
List IP stack statistics.

**`debug netbios`**
List NetBIOS (i.e. Windows 95 and WfW) statistics.

**`debug mem`**
List statistics from the Ethernet Interface memory module.

**`debug lpq`**
List statistics from the queue module.

**`debug io`**
List statistics from the I/O port module.

**`debug eeprom`**

List ROM contents.

**`debug nif`**

List network interface statistics.

## Miscellaneous Commands

These commands do not fall under any specific section of the command shell but they are used quite frequently.

**`save [default]`**

Save the current settings to flash memory so they are available after power cycles. Sysinfo, destination, model, logpath, variable, user, and I/O port settings will be saved. If **`default`** is specified as well, factory settings will be saved, overwriting any new settings you have configured.

**`reset`**

Perform a warm boot or hardware reset simulating a power-on reset. Restores current settings to those stored in flash memory since the flash memory settings will be read and loaded into memory upon bootup.

**`load [default]`**

Load the settings stored in flash memory and use them as the current or working settings. If **default** is specified as well, factory settings will be loaded.

**`lpstat [`*`ioport`*`] [`*`jobID`*`]`**
**`lpstat prn`**

Display active and queued jobs and I/O port status for a given ***ioport*** or ***jobID***. Specifying one of these parameters will shorten the output focusing on the particular I/O port or print job specified.

**`cancel `*`jobID`***
**`cancel d1prn-10`**

Remove a job from an I/O port queue. Use "**`lpstat`**" to find a particular job ID first.

**start fox|tts|loopb prn**
**start fox prn**

Begin a debugging test on one of the I/O ports on the Ethernet Interface. The tests available are:

| | |
|---|---|
| **fox** | A continuous stream of text sent to the attached printer. This is a good test for troubleshooting hardware as long as the attached printer supports text output. |
| **tts** | A continuous stream of Gandalf 400C TTS-compatible text sent to the attached printer. |
| **loopb** | Loopback test. Any input characters from the device attached to the I/O port is echoed back. |

**stop prn**
**stop prn**

Stop an output test on an I/O port.

**disable *ioport*|*destination***
**disable prn**

Disable an ***I/O port*** so that queued jobs are not printed, or disable a ***destination*** so jobs can not be queued to it.

**enable *ioport*|*destination***
**enable prn**

Enable an ***I/O port*** so that queued jobs are printed, or enable a ***destination*** so jobs can be queued to it.

**close tcp *TCPindexnumber***
**close tcp 3**

Force a TCP/IP connection between a TCP/IP host and the Ethernet Interface to close. The ***TCPindexnumber*** can be retrieved from “debug tcp” output.

**ping [-s] *hostIPaddress* [*datasize* [*packetnumber*]]**
**ping 192.75.11.30**

"**ping**" another TCP/IP host specified by ***hostIPaddress*** on the Ethernet Interface network. ***datasize*** is the datagram packet size which defaults to 64 bytes if no size is included in the syntax and ***packetnumber*** is the number of requests to be sent.

**NOTE:** To use a host or IP name instead of the address, you must have set the DNS server on the Ethernet Interface. Use the command "set sysinfo dns..." to do this.

**telnet *hostIPaddress* [*escapecharacter*]**
**telnet 192.75.11.35**

Start a Telnet session with another TCP/IP host specified by ***hostIPaddress*** on the Ethernet Interface network. If ***escapecharacter*** is used, it resets the key sequence used to exit the Telnet session. It will return you to the telnet> prompt where you can execute "***quit***". Use the "***keycode***" command to find out exact escape characters if needed. The default character is CTRL-].

**NOTE:** To use a host or IP name instead of the address, you must have set the DNS server on the Ethernet Interface. Use the command "**set sysinfo dns...**" to do this.

**chr *string***

Echo ***string*** or redirect ***string*** to an I/O port using "**chr *string* > *ioport***".

**keycode**

Determine the hexadecimal value for a key to be used as the escape character with the Ethernet Interface built-in "**telnet**" command.

# 14 *Extra Features*

## Ethernet Interface Security

There are TCP access lists available to restrict host connections with the device.

### Users and Passwords

The Ethernet Interface supports two user types:

| | |
|---|---|
| **root** | Access to everything within the print server including all configurable settings. |
| **guest** | Ability to list settings only. |

Passwords can be set for each user type. However, most often you would just set a password for the root user to protect the Ethernet Interface configuration. Guest users can not alter the print server configuration in any way.

To configure a root password on your Ethernet Interface:

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP. The commands to set a root password are:

Syntax:

**`set user passwd`** ***`username password`***
**`save`**

Example:

```
set user passwd root your_password_for_root
save
```

2. Direct your Web browser to URL "**`http://`*`EthernetInterfaceIPaddress`*`/adminConf.html`**" (e.g. "**`http://192.75.11.9/adminConf.html`**").

**NOTE:** If prompted for a "User ID" and password first, type in "**`root`**" for the user ID and press ENTER at the password prompt since there is no password by default.

3. At the "Administration Configuration" HTML form that displays, scroll down to the "Passwords" section.
4. Click within the "Old" field beside the "Root Password" heading and enter the existing root password. By default, there is no root password so you can go to the next step without typing anything in this field.
5. Within the "Root Password" section, click within the "New" field and enter the new root password.
6. Within the "Root Password" section, click within the "Confirm" field and enter the new root password again. Remember this is case sensitive.
7. Click on the SUBMIT button when done and physically repower the print server to make the new setting takes effect.

From this point on, anytime you log in to the Ethernet Interface as "**root**", you will need to specify this password or your login attempt will fail.

**NOTE:** To clear this password or change it, use the same "Administration Configuration" HTML form. Just enter the appropriate "Old" password and put in the new one (or nothing if you do not want a root password any longer). The commands directly on the Ethernet Interface are:

```
set user from default
save
```

## TCP Access Lists

Within TCP/IP environments, the Ethernet Interface can restrict host access to destinations/queues and remote command (i.e. rsh, rcmd, remsh and telnet) execution services. This is done using an access list similar in function to the Unix .rhosts file.

To view the current access list on the print server:

**NOTE:** Access list settings are not configurable through the HTML forms provided with the Ethernet Interface.

1. Start a Telnet session with the Ethernet Interface.

Syntax:

**`telnet`** ***`EthernetInterfaceIPaddress`***

2. Log in as "**`root`**" and press ENTER at the password prompt since there is no password by default (or your password for your home set).
3. List the current access list.

Syntax:

**`List tcpip`**

If the list is empty, all hosts have access to the Ethernet Interface services. If there are entries in the list, only those hosts specified have access to printing and remote command execution.

To add and delete access list entries, the commands are:

Syntax:

**`store tcpip tcp access add|del`** ***`hostIPaddress`*****`|`**
***`networkaddress`***
**`reset`**

where ***hostIPaddress*** is the IP address of a TCP/IP host on your network and ***networkaddress*** is the address of a subnet on your network.

Example:

```
store tcpip tcp access add 192.75.11.25
store tcpip tcp access add 192.75.12.0
store tcpip tcp access del 192.75.11.25
reset
```

**NOTE:** Although the maximum number of entries in the access list is 10, each entry can refer to a network rather than a specific host. This allows all hosts on that specified network to have access plus any individual hosts specified in the list.

# Printer Monitoring and Logging

One of the key aspects of maintaining a computing environment is monitoring printer status and logging this information to useful places. The Ethernet Interface allows this through its built-in HTML forms, command set, and logpaths.

## Printer and Print Job Monitoring

To view the current status of an I/O port on the Ethernet Interface, two methods are available:

1. Selecting the desired I/O port on the "Status" HTML form (i.e. "**`http://EthernetInterfaceIPaddress/indexStatus.html`**"; e.g. "**`http://192.75.11.9/indexStatus.html`**") that comes with the Ethernet Interface.
2. "**`lpstat`**" command directly on the print server once logged in as "**`guest`**" or "**`root`**".

In each case, you are given a description of each I/O port status and a list of queued jobs. Table 7 describes some of the common terms you may encounter.

**Table 7. Key Printer Logging Terms**

| Term | Description |
|---|---|
| “idle” | There is no job queued for the Ethernet Interface I/O port. |
| “blocked” | The printer is not allowing the Ethernet Interface to send data to it. Check that there is not a printer error and it is online and ready to go. |
| “waiting” | The Ethernet Interface knows about a print job but is waiting for the host to send more data or to send an expected packet. |

## Printer Logging Through Logpaths

In the Ethernet Interface product manual, destinations are described as logical queues with associated models and logpaths. Models determine if any extra processing is needed with the print jobs passing through and logpaths determine whether any logging is needed for each job.

Each logpath on the Ethernet Interface consists of two parts:

**Type** The type of log information to be captured. The choices are “**`job`**” for job ID and username, “**`user`**” for user ID (and three messages per job), “**`pgcnt`**” for total pages printed in a job, “**`cksum`**” for file checksums, “**`printer`**” for special printer feedback, and “**`ioport`**” for parallel printer status messages.

**Port** Where this log information will be sent to. The choices are a **TCP port number** (e.g. 2000), an **email address** (including an alias), or a central host running a **SYSLOG daemon**.

To view the current logpath settings on the print server:

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP or using Telnet (e.g. Telnet "*ipaddress*"). The command to view the logpath settings is:

Syntax:

**`list logpath`**

**NOTE:** If prompted for a "User ID" and password first, type in "**`root`**" for the ID and press ENTER at the password prompt since there is no password by default.

2. Direct your Web browser to URL "**`http://`*`EthernetInterfaceIPaddress`*`/destConf.html`**" (e.g. "**`http://192.75.11.9/destConf.html`**").
3. At the "Print Path Configuration" HTML form that displays, select a destination link (e.g. d1prn) from the top of the page to bring up the appropriate destination form.
4. Once the desired destination HTML form displays, scroll down to the "Logpath Type" and "Logpath Port" sections to view the current logpath settings for this particular destination.

At this point, you can alter any of these settings and then click on the SUBMIT button to store them into the Ethernet Interface. Remember to repower the Ethernet Interface to make the settings take effect.

# Ethernet Interface Naming Schemes

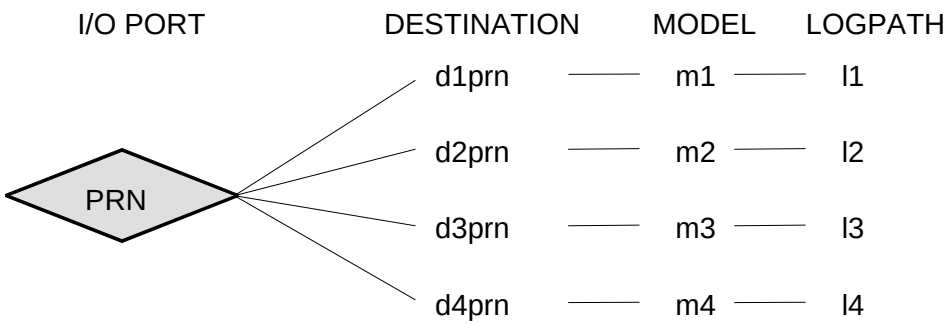



**Figure 20. Ethernet Interface Default Names**

**NOTE:** When the IPDS feature is installed, queue name **d4prn** is not available.

# Chapter 14 Ethernet Interface Naming Schemes

# 15 *Glossary*

| | |
|---|---|
| **ARP** | Address Resolution Protocol. Associates a selected IP address with a network device Ethernet address. |
| **bps** | Bits per second. |
| **Centronics** | Parallel port interface standard found on most printers. |
| **daemon** | A continuously running background process that handles system-wide functions like print spooling. |
| **default router** | Local device that forwards any IP packets destined for another subnet. |
| **destination** | Logical print queue on the Ethernet Interface which hosts send their print jobs to. There are eight destinations (two per I/O port) by default. |
| **DHCP** | Dynamic Host Configuration Protocol. Allows a network device to discover its IP address dynamically upon bootup. The IP address does not need to be stored within the device itself permanently. |
| **Download Mode** | Refers to the condition of the Ethernet Interface when in a startup condition, downloading configuration information. |
| **DNS** | Domain Name Server. Host providing responses to queries for a given host name IP address. |
| **EEPROM** | Electrically Erasable/Programmable Read-Only Memory. |

# Chapter 15 Glossary

| | |
|---|---|
| **factory defaults** | Settings shipped with the Ethernet Interface. |
| **Factory Settings** | S2 jumper position stating all factory default settings are to be used while the Ethernet Interface is up and running. |
| **Firmware Panic** | Unrecoverable errors detected by the Ethernet Interface firmware force the Print Server into Firmware Panic mode. Manually reset the Ethernet Interface to resume operation. |
| **Flash** | Stores firmware code and configurable settings. Allows for upgrades without replacing hardware inside the Ethernet Interface. |
| **FTP** | File Transfer Protocol. Used for transferring files from one TCP/IP host to another and used in the upgrade process. |
| **Hardware Exception** | Buss errors, address errors, and illegal instructions force the Ethernet Interface into this non-operational mode. |
| **HTML** | HyperText Markup Language. Format used for documents viewable on the World Wide Web. |
| **ifnum** | Interface Number. Represents the network interface. With an Ethernet Interface, this will always be “1” for Ethernet. |
| **interface script** | Unix host filter file that processes the print job before it is sent over the network to the Ethernet Interface. |
| **I/O port** | Port for attaching peripherals to. The Ethernet Interface provides four: PRN1, PRN2, COM1, COM2. |
| **IP Address** | The Internet Protocol Address. A numeric address such as 123.45.61.23 which identifies a printer or server in a LAN or WAN. |
| **LAN** | Local Area Network. |

| | |
|---|---|
| **LED** | Light Emitting Diode. The printer has an LED display which shows the status of the printer to the operator. |
| **logpath** | Determines type of print job and printer logging needed per job. One logpath is associated with every destination. |
| **LPD/LPR** | Line Printer Daemon. The most common TCP/IP remote printing protocol that crosses all hardware utilizing IP. |
| **MIB** | Management Information Base. A set of variables (database) managed by an SNMP manager application. |
| **model** | Defines how a print job should be processed (e.g. banner pages added, ASCII to PostScript conversion) as it passes through the Ethernet Interface. One model is associated with every destination. |
| **NetBIOS** | Network Basic Input Output System. Common interface among PC networks. |
| **Monitor Mode** | Refers to the condition of the Ethernet Interface with no configuration or IP address loaded. |
| **npsh** | Extensive built-in command shell within the Ethernet Interface. |
| **PDF** | Portable Document Format. Encodes different types of documents enabling them to be read across multiple platforms. |
| **ping** | Standard command to test a TCP/IP connection. (e.g. “`ping 192.75.11.9`”) |
| **print path** | Three-stage path a print job takes when it is sent from a host to a printer through the Ethernet Interface. |

| | |
|---|---|
| **protocol** | A set of rules or conventions governing the exchange of information between computer systems, or between a printer and a host computer. For computer printers, a protocol is the coding convention used to convey and print data. A printer protocol includes codes for printing text and graphics, as well as codes instructing the printer to perform special operations, and machine-to-machine communication codes. |
| **PSERVER** | Print Server. A Novell print method where the Ethernet Interface continuously polls the Novell file server print queue looking for print jobs. |
| **RAM** | Random Access Memory. Volatile memory within the Ethernet Interface that contains current/ working settings. Settings are lost once the power is removed. |
| **RARP** | Reverse Address Resolution Protocol. Allows a network device to discover its IP address dynamically upon bootup. The IP address does not need to be stored within the device itself permanently. |
| **ROM** | Read-Only Memory. |
| **router** | A device that forwards IP packets to their destination. Also called a gateway. |
| **RPRINTER** | Remote Printer. A Novell print method where the Ethernet Interface waits for jobs to be sent to it from a defined PSERVER. |
| **SNMP** | Simple Network Management Protocol. A standard protocol used to monitor network devices called “SNMP agents.” |
| **socket** | TCP connection between two hosts consisting of a source and destination TCP port number at each end. |

| | |
|---|---|
| **subnet mask** | A binary value used to divide IP networks into smaller sub-networks or subnets. This mask is used to help determine whether IP packets need to be forwarded on to other subnets. |
| **TCP/IP** | Transmission Control Protocol/Internet Protocol. Suite of protocols that act as the base protocol for the Internet. |
| **TCP port** | A logical connection point in the software of a TCP host or device. When two IP devices talk, they establish a socket which consists of a source and destination TCP port number on both ends. |
| **telnet** | Command and protocol to establish a terminal connection between two hosts on an IP network. |
| **UTP** | Unshielded Twisted Pair. A cable used for telephone and computer-to-computer connections. |
| **WAN** | Wide Area Network. |

# Chapter 15 Glossary

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